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| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number)<br>The report documents a menu technique which enables the user to execute the<br>Venture Evaluation and Review Technique (VERT) in a quasi-interactive mode.<br>VERT is run interactively through the user responding to executive file prompts<br>and by the creation of VERT input data files through the use of a free form<br>FORTRAN program. However, it is not totally devoid of batch processing since<br>the free form FORTRAN program converts the user input into a card image file<br>for later processing by the VERT FORTRAN program. Secondly, the menu technique |                       |  |

provides an option for the user to run VERT, utilizing the IBM Conversational Monitoring System (CMS) Batch Facility.

The menu technique displays a series of menus to the user from which he may select any one of several options in executing the VERT program. The menu technique allows the user to ignore the many and varied housekeeping tasks required in executing the VERT program. Thus, the menu technique will significantly enhance the user's productivity.

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**USATSARCOM**

**TECHNICAL REPORT 82-4**

**A MENU TECHNIQUE FOR UTILIZING  
VERT INTERACTIVELY**

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**JULY 1982**

**Final Report**

**US ARMY TROOP SUPPORT AND AVIATION MATERIEL READINESS COMMAND  
DIRECTORATE FOR PLANS AND SYSTEMS ANALYSIS**

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## A MENU TECHNIQUE FOR UTILIZING VERT INTERACTIVELY

### 1.0 BACKGROUND

1.1 The purpose of this technical report is to describe a procedure which enables the user to execute the Venture Evaluation and Review Technique (VERT) in a quasi-interactive mode.

1.2 VERT is a computerized, stochastic network model designed to simulate decision environments under risk. VERT provides the program manager with accurate risk information in all three risk parameters (time, cost and performance) simultaneously. Appendix A to this report contains a copy of a short article written in June 1979 by Major Greg A. Mann, USAF, which describes the capabilities of VERT and its value in assessing the risk of a weapon-system acquisition process. In addition, the network methodology of VERT provides a systematic way to analyze the various tasks required to accomplish a project or mission. This structured approach greatly facilitates the planning and control of such projects.

1.3 The version of VERT utilized by the menu technique will enable the user to construct a network of up to 400 nodes and 750 activities. In addition, up to 85 nodes may be selected by the user in obtaining network time, path cost, total cost, and performance output information in histogram form. The user signals his selection to VERT by placing a two digit number (numbered from 1 to 85) in Columns 15 and 16 of the node card. Terminal nodes automatically print out and therefore, should not be numbered. Furthermore, placing a "16" in Columns 13 and 14 of the node card (including

any terminal nodes desired) will establish a "X" and "Y" data file of the histogram output for subsequent "camera-ready" graphical display (color or black and white) via the menu technique.

1.3.1 This version of VERT also includes an user selected option for obtaining a listing of the cumulative mean completion times for each node in the network listed in ascending time order. A "1" entered in Column 9 of the control card evokes this option. A blank in Column 9 signals VERT that the option is not desired. This option is very valuable for analyzing the network.

1.4 The Decision Models Directorate of the US Army Armament Material Readiness Command (ARRCOM) distributed in November 1979 for public release a user's manual for VERT. With the inclusion of the replacement page attached as Appendix B to this report, that user's manual may be used for running this version of VERT. Copies of the VERT User's Manual may be obtained from Mr. Albert J. Patsche, AUTOVON 793-5292. Limited copies are also available by calling Mr. Kenneth L. Kearley, AV 693-3181, Directorate for Plans and Systems Analysis, US Army Troop Support and Aviation Materiel Readiness Command (TSARCOM).

1.5 The author of VERT, Mr. Gerald L. Moeller, has co-authored a book <sup>1/</sup> which introduces the subject of network analysis, provides a history of VERT and describes the VERT computer model in great detail. The version

<sup>1/</sup> Moeller, Gerald L; Lee, Sang M.; and Digman, Lester A.; Network Analysis for Management Decisions; Kluwer-Nijhoff Publishing, Copyright 1982.

of VERT described in that book is different from the one utilized by the menu technique in this technical report; however, most of the VERT documentation contained in the book is still applicable. Mr. Moeller is currently employed with the US Army DARCOM Installations and Services Activity, Rock Island, IL, AUTOVON 693-5918.

## 2.0 INTRODUCTION

2.1 To use the menu technique, access is required to a host which supports the IBM Virtual Machine Facility/370 (VM/370). This system in turn contains the Conversational Monitor System (CMS), <sup>2/</sup> from which the menu technique owes its existence. Thus, in addition to a knowledge of VERT, the user should have an appreciation of CMS. However, because the procedure described in this technical report is in an easy-to-use menu form, it is not necessary that the user be proficient with CMS to use the menu technique. Furthermore, with a few hours of training in VERT and CMS, the user should be capable of using the menu technique on an existing VERT input data file.

2.2 To make use of the camera-ready graphics and network plotting features of the menu technique, access is required to the Tektronix Plot-10 CALCOMP Preview Routine <sup>3/</sup> and the ISSCO TELLAGRAF Computer Graphics System. <sup>4/</sup> The menu technique may still be used without having access to these two systems; however, Menu Items 6 and 7 in the Main Menu would not be available. In addition, no node card of a VERT data file should contain a "16" in Columns 13 and 14 of the card. From this discussion, it should be apparent that the menu technique has been designed primarily for use with a computer graphics terminal. In TSARCOM, the menu technique is used with either a Tektronix 4014 (Black and White CRT Screen) or a Tektronix 4027

<sup>2/</sup>

IBM, Virtual Machine Facility/370: CMS User's Guide, Order Number GC20-1819-2, Poughkeepsie, New York 12602.

<sup>3/</sup>

Tektronix, Preview Routines for CALCOMP Plotters, Document Number 062-1526-00, Release Number 1, March 19, 1973, Beaverton, Oregon 97005.

<sup>4/</sup>

Integrated Software System Corporation (ISSCO), TELLAGRAF User's Manual, Version 4.0, Copyright 1981, San Diego, CA 92121.



(Color CRT Screen) computer graphics terminal (Menu Item 6 in the Main Menu is not usable with the Tektronix 4027). However, any computer graphics terminal which emulates these two pieces of hardware may be used. Furthermore, a teletype terminal, a regular CRT device, or a Texas Instrument (TI) Silent 700 suitcase terminal may also use the menu technique. The only exception as noted previously, is that Menu Items 6 and 7 of the Main Menu would not be available.

2.3 A certain amount of "housekeeping" is necessary to be accomplished before the user can begin using the menu technique. The user first needs to obtain a userid and password for CMS. Then he needs to obtain 4000 blocks of disk space on his 191 "A" Disk and 1000 blocks of disk space on a second disk (194 "W" Disk). This second disk should be formatted in a multi-access mode ("MW"). Then these disks must be loaded with the files listed in Appendix C. With the exception of the two VERT Source Listings (because of their size), the module files, and certain unprintable graphics files, the contents of those files are shown in Appendix D. A magnetic tape can be made available by the author of this technical report to aid the initial loading. Once loaded, a few alterations need to be made in certain executive files before the menu technique is ready to be used. It is recommended that you run some of the sample VERT data files provided before you begin creating your own in order to test out the menu technique for any errors in loading the files. Figure 1, Pages 20-23, provides an example of the "housekeeping" necessary to enable a new user who has access to the TSARCOM Midwest S&E Computer to use the menu technique.

2.4 If you use 194 as your "W" Disk with multi-access mode, then only the following executive files need to be altered, otherwise everywhere "194" appears you will have to change it to the new number:

2.4.1 VERTNEW BATCH A1

- Line 1 - Change "FPKERLY" to your userid
- Line 1 - Change "FPVERT" to "bbVERT" where "bb" are the first two letters of your userid
- Line 3 - Change "FPKERLY" to your userid
- Line 4 - Change "FPKERLY" to your userid
- Line 4 - Change "KEN" to your 191 read only access password
- Line 6 - Change "FPKERLY" to your userid
- Line 6 - Change "KLK" to your 194 multi-access password

2.4.2 VERTNEW1 BATCH A1

- Line 1 - Change FPKERLY" to your userid
- Line 1 - Change "FPVERT" to "bbVERT" where "bb" are the first two letters of your userid
- Line 3 - Change "FPKERLY" to your userid
- Line 4 - Change "FPKERLY" to your userid
- Line 4 - Change "KEN" to your 191 read only access password
- Line 6 - Change "FPKERLY" to your userid
- Line 6 - Change "KLK" to your 194 multi-access password

#### 2.4.3 VERTTEST EXEC A1

Line 31 - Change "REMOTE 4" to your remote job entry site number

Line 48 - Change "FPKERLY" to your userid

#### 2.4.4 VERTBAT FORTRAN A1

Line 12 - Change "FPKERLY" to your userid. Then recompile, load, and generate a new module for this FORTRAN program.

#### 2.4.5 VERTBAT1 FORTRAN A1

Line 18 - Change "FPKERLY" to your userid. Then recompile, load, and generate a new module for this FORTRAN program.

### 3.0 DESCRIPTION

3.1 The menu technique consists of a set of CMS Executive files which display the various menus and control the execution of those activities displayed in the menus. There are 5 menus which make up the menu technique. They are: (1) Main Menu Level (2) VERT NETWORK Plot Secondary Menu Level, (3) VERT Graph Secondary Menu Level, (4) VERT Datasets Display Listing Secondary Menu Level, and (5) Tertiary Menu Level for Editing VERT Listing Data Files. An example of these menus with the name of the respective executive file shown at the top of the page are provided as Figures 2-6, Pages 24-28.

### 3.2 MAIN MENU LEVEL

3.2.1 Figure 2, Page 24, depicts the Main Menu. "VERTEX" is the name of the executive file which displays this menu. Main Menu Item 1 prompts the user for the filename of the VERT data file to be run and whether "X" and "Y" data files for any previously selected node histogram output are to be created for the run. The VERT program is then run. The executive file which carries out Main Menu Item 1 is called " VERTRUN".

3.2.2 Item 2 in the Main Menu lets the user do much the same thing as in Item 1 but with several important differences. Item 2 runs VERT in CMS Batch mode. Running in batch mode frees up the terminal for other activity while the job is executing. Thus, this option should be selected for VERT runs that will take more than a few minutes to complete. The disadvantage of the batch mode is that under heavy workloads, the job may not execute for several hours or until the next day. Because of this,

it is highly recommended that debugging jobs be run under Item 1 of the Main Menu and Item 2 reserved for "Analysis" and "What-if" runs. In addition, for debug runs, no more than five monte carlo iterations are normally required for testing the computerized network structure. The executive file which runs Item 2 of the Main Menu is called "VERTBAT".

3.2.2.1 Secondly, running VERT in CMS Batch mode enables the user to submit several jobs back to back. The menu technique uses the second disk (194 "W" Disk) to keep track of each separate run. It is important to remember that all of your VERT jobs must have completed in CMS Batch mode before any one job can be examined. Failure to heed this warning could result in your having to reinitialize and reload your second disk. There are safeguards built in the menu technique to avoid this, however, the persistent user who answers the prompts dishonestly can succeed in damaging his files on the second disk.

3.2.3 The third item in the Main Menu allows the user to view his output for a run previously made from choosing either Menu Item 1 or Item 2 of the Main Menu. If you had run VERT online (Menu Item 1), then the executive file "VERTTEST" places you in CMS Edit mode, at the bottom of the output file called "VOUTPUT AAAA A1". This file is created anew for each VERT online run. If you had run VERT from CMS Batch mode (Menu Item 2), then VERTTEST places you in CMS Edit mode on your second disk (194 "W" Disk) at the top of the output file. The name of the output file will be the same as the input file with the exception of the first two letters which will be "VO". This convention requires the user to use "VI" as the first two letters of all his

VERT input data file filenames. Since CMS allows a maximum of 8 characters for a filename, the remaining 6 or less alphanumeric characters may be anything the user desires.

3.2.3.1 VERTTEST assumes that VERT online runs are primarily debugging runs, while VERT offline (CMS Batch) runs are primarily "Analysis" and "What-if" runs. This "online" vs "offline" difference accounts for the different placement of the CMS Editor pointer in the output file of each type. For debugging runs, "X" and "Y" data files of selected node histogram output should not be requested. Thus, when Menu Item 3 is selected to find out if a debug run was successful or not, VERTTEST will position the CMS Editor pointer at the bottom of VOUTPUT AAAA A1. If this bottom line does not say "LAST RANDOM NUMBER SEED=" then you know that you have errors in the file. You can then enter "QUIT" or "FILE" to get out of CMS Edit mode or, using the various CMS Edit commands, record what errors you made.

3.2.3.2 Once you are out of CMS Edit mode, VERTTEST asks you if you want a hardcopy printout of the output file or not. If you had run the VERT job from CMS Batch mode, VERTTEST also gives you the option to erase any output files you no longer need (A very good idea for subsequent "What-if" runs on the same VERT input data file).

3.2.4 The fourth menu item in the Main Menu, aids the user in creating his own VERT input data file. The executive file which runs this menu item is called "VERTIN". VERTIN gives the user a choice of using free form (commas are used to separate the data fields) or fixed form (data must be



placed in the correct fields by either spacing or using the CMS Tabset command) format for creating the VERT input data file. As mentioned previously, the user is assumed to already have a knowledge of VERT.

3.2.5 Item 5 of the Main Menu allows the user to edit and alter an existing VERT input data file. "VERTEDIT", the executive file which runs this menu item prompts the user for the filename of the VERT data file to be edited.

### 3.3 VERT NETWORK PLOT SECONDARY MENU LEVEL

3.3.1 Entering a "6" from the Main Menu will cause a second menu to be displayed (CRT terminal). "VERTPLT" is the executive file which displays this menu. Figure 3, Page 25, depicts this menu. Menu Item 1 of this secondary menu allows the user to create his own VERT plot data file. At the present, the method used to create a VERT network plot is rather crude. The user must first rough out a sketch of the network on a piece of graph paper. Then he must supply "X" and "Y" coordinate points for each node (box), arc (line) and connector (circle). Appendix E contains an User's Manual for the VERTPLOT Program along with the record layout for the data file. Pages 34 and 88-92, Appendix D contain sample VERTPLOT data files. In addition, no plotter is currently available at TSARCOM for plotting the data file. Thus, viewing the network plot is limited to displaying the network on a Tektronix 4014 (or equivalent) computer graphics terminal using the Tektronix Plot-10 CALCOMP Preview Routine. Hardcopies can be made via a Tektronix hardcopy unit, but the pages must then be pieced together to see

the entire network. Action has been taken at TSARCOM to obtain an on-line drum plotter and to improve the VERTPLOT program. However, a target date for completion of these actions are presently unknown. "VERTPLT1" is the executive file which runs this menu item. Figure 7, Pages 29-30, provide some helpful hints in creating your own VERTPLOT data file.

3.3.2 Menu Item 2 of the VERT Network Plot Secondary Menu allows the user to edit and alter an existing VERTPLOT data file. "VERTPLT2", the executive file which runs this menu item, prompts the user for the filename of the VERTPLOT data file to be edited.

3.3.3 Menu Item 3 of this secondary level menu allows the user to view a VERTPLOT data file which had been created previously. "VERTPLT3", the executive file which runs this menu item prompts the user for the filename of the VERTPLOT data file to be displayed. After the user enters the filename, the following options list is displayed on the screen:

- E = Erase
- H = Hardcopy
- W = Set Screen Size
- S = Skip Frames
- R = Reset Offset
- C = Continue
- Q = Stop Program
- ? = This Message

3.3.3.1 The Tektronix Plot-10 Preview Routine for CALCOMP Plotters User's Manual <sup>5/</sup> explains what each of the items in this list do. However, only the third (Set Screen Size) and seventh (Stop Program) item listed in Paragraph 3.3.3 above are used in displaying a VERTPLOT data file. Entering "Q" at this time indicates that you entered the wrong plot file filename or changed your mind about viewing the plot. Entering a "W" indicates that you wish to set the "X" and "Y" coordinates in inches for the entire plot or portion of the plot to be shown on the CRT graphics screen. Once a "W" has been entered, the message "WHERE WOULD YOU LIKE ORIGIN (X,Y)" will be shown on the screen and a bell will sound signalling you to enter the "X" coordinate point for the lower, left-hand portion of the plot to be displayed. Once entered, another bell will sound signalling you to enter the "Y" coordinate point for the lower, left-hand portion of the plot to be displayed. Once entered, the message "ENTER SIZE (WIDTH, HEIGHT)" will be shown on the screen and a bell will sound signalling you to enter the distance in inches from the "X" coordinate point previously entered. Once entered, another bell will sound signalling you to enter the distance in inches from the "Y" coordinate point previously entered. Once entered, another bell will sound signalling you to enter a "C" (for "continue"). Once entered, the screen will clear and the plot will be displayed. After viewing the plot, depress the "RETURN" button on your terminal. NOTE: it is highly recommended that you view the entire plot on the screen first before you make any hardcopies of the plot. Following this advice will allow you to see any corrections needed to the network plot structure thus saving time and paper.

3.3.4 Menu Item 4 of the VERT Network Plot Secondary Menu provides a display of a sample plot. The first screen is a display of the entire plot and the next 4 screens illustrate what a blow-up of the plot looks like. "VERTPLT4" is the executive file which runs this menu item. VERTPLT4 prompts the user for data throughout the running of this menu item.

### 3.4 VERT GRAPH SECONDARY MENU LEVEL

3.4.1 Entering a "7" from the Main Menu will cause a second menu to be displayed (CRT terminal). "VERTGRAF" is the executive file which displays the menu. Figure 4, Page 26, depicts this menu. Menu Item 1 of this secondary level menu allows the user to view (in "camera-ready" graphics form) network time, path cost, total cost, and performance output information for specific nodes previously selected during the running of the VERT program. "VERTGRF1" the executive file which runs Menu Item 1, keeps track of how many graphs you had selected to be displayed. Since VERT online jobs and VERT offline (CMS Batch) jobs are handled differently by VERTGRF1, it prompts you for which method you used. If you ran VERT offline, you will then be prompted for the maximum 6 alphanumeric character unique filename of the VERT job run. For online jobs, VERTGRF1 uses the data file called "VBANKNAM DATA A1" to pick up the names of the "X" and "Y" data files for the nodes selected from the last online job completed which requested that these "X" and "Y" data files be created. VERTGRF1 then prompts the user to enter the title for the graph and the title for the X-axis. The title for the Y-axis is fixed as is the basic format of the graph. VERTGRF1 also displays the name of the "X" and "Y" data file to be graphed so that

the user knows which titles to put with which graphs. The graph is then displayed. The user depresses the "RETURN" button on his terminal when he is finished viewing the graph. For online jobs, if another graph is to be displayed, the cycle will repeat until all the filenames in VBANKNAM DATA A1 have been displayed. Then the user will be returned to the VERT Graph Secondary Menu Level. For offline jobs, after all the graphs for one particular VERT job have been displayed, VERTGRF1 asks the user if he wants to display graphs for another VERT job which had been run offline. A negative response will return to the user to the VERT Graph Secondary Menu Level. A positive response will result in a repetition of the cycle.

3.4.2 Menu Item 2 of the VERT Graph Secondary Menu allows the user to create his own graphics data file. A knowledge of the ISSCO TELLAGRAF System is required in order to use this option. "VERTGRF2" is the executive file which runs this menu item.

3.4.3 Menu Item 3 of the VERT Graph Secondary Menu allows the user to edit and alter a previously created graphics data file. "VERTGRF3", the executive file which runs this menu item prompts the user for the filename of the graphics file to be edited.

3.4.4 Menu Item 4 of the VERT Graph Secondary Menu displays a graphics file which had been created previously from Item 2 of this menu. "VERTGRF4", the executive file which runs this menu item prompts the user for the filename of the graphics file to be displayed.

3.4.5 Menu Item 5 displays three sample graphs of a previously completed decision risk analysis (DRA) using VERT. The user depresses the "RETURN" button on his terminal to cycle through the graphs.

### 3.5 VERT DATASETS DISPLAY LISTING SECONDARY MENU LEVEL

3.5.1 Entering "LIST" from the Main Menu will cause a second menu to be displayed (CRT terminal). "VERTINDX" is the executive file which displays this menu. Figure 5, Page 27, depicts this menu. Menu Item 1 of this secondary menu allows the user to get a listing and brief description of every executive file used in the menu technique. "VERTIND1" is the executive file which runs this menu item. Similarly, "VERTIND2" through "VERTIND6" runs Menu Items 2 through 6 of the VERT Datasets Display Listing Secondary Menu. VERTIND1 prompts the user for his terminal type (Tektronix 4014 or Agile Line Printer) and the number of lines per page. VERTIND1 then displays a listing of the VERT executive files. The user continues depressing the "RETURN" button on his terminal until the list is completed and he is returned to the VERT Datasets Display Listing Secondary Menu. VERTIND2 through VERTIND6 all function in the same manner.

### 3.5.2 TERTIARY MENU LEVEL FOR EDITING VERT LISTING DATA FILES

3.5.2.1 Entering a "7" from the VERT Datasets Display Listing Secondary Menu will cause another menu to be displayed (CRT terminal). "VERTIND7" is the executive file which displays this menu. Figure 6, Page 28, depicts this menu. Menu Items 1 through 6 of the Tertiary Menu for Editing VERT Listing Data Files allow the user to edit and alter the data file lists shown



in the menu. No prompting is provided by VERTIND7 since only one data file exists per menu item.

3.6 Entering an "END" from the main menu level, any of the secondary menu levels or the tertiary menu level will exit the user from the menu technique and return him to CMS. Entering a "R" from either the secondary menu levels or the tertiary menu level will return the user to the main menu level. Entering a "S" from the tertiary menu level will return the user to the VERT Datasets Display Listing Secondary Menu Level.

3.6.1 The menus have all been designed so that the user will remain at the menu level he is currently operating at until he either 1) Ends the session 2) Goes to a lower menu level or 3) Returns to a higher menu level. Failure to supply the correct entry at each menu display will cause the menu to be displayed again.

3.6.2 Automatic clearing of the Tektronic 4014 graphics terminal CRT screen or Top-of-Form feed for the Agile Line Printer exists for the VERTIND1 through VERTIND6 executive files only. To allow as much flexibility as possible to users in using the menu techniques for either a TI 700, Tektronix 4027 (scroll CRT terminal), Agile Line Printer, or a Tektronix 4014 (storage-tube CRT terminal), the author decided to let those individuals using the Tektronix 4014 or Tektronix 4027 to do their own clearing of the CRT screen.

3.7 Appendices F-I of this technical report provide some sample terminal sessions using the menu technique. The samples cover using a Tektronix 4054

Graphics Terminal (Emulates a Tektronix 4014 Graphics Terminal), a Tektronix 4027 Graphics Terminal and an Agile Line Printer.

#### 4.0 CONCLUSIONS

4.1 As was mentioned at the beginning of the report, the menu technique executes VERT in a quasi-interactive mode. VERT is run interactively in the sense of the user responding to the executive file prompts and by the creation of VERT input data files through the use of the "VERTFREE" FORTRAN Program. However, it is not totally devoid of batch processing as is in the case of using CMS Batch in the executive file "VERTBAT" and in the conversion of user input by the VERTFREE FORTRAN Program into a card-image file for later processing by the VERT program.

4.2 By the TSARCOM Directorate for Management Information Systems (DMIS) making the switch from the IBM OS/360 System to the IBM Virtual Machine Facility/370 and its Conversational Monitor System (CMS) component, tremendous productivity gains have been realized in executing the VERT program. What had taken several weeks in the creating of the VERT input data file, debugging the network, and running and analyzing the output now takes less than a week.

4.3 These user-created CMS executive files allow the user to ignore the many and varied administrative and housekeeping tasks required in executing the VERT program. The easy-to-use menus not only enable the analyst who is familiar with VERT to pace quickly through the actions required to run and analyze a VERT application, but also enable the customer to be provided with a tool to obtain answers to "What-If" questions on a specific project.

enter class 114411  
USACC DATA NUMBERS ARE: AV-693-3582 OR 314-263-3582 --- HAVE A NICE DAY  
class 141 start

S+E VM/SP ONLINE  
!

.log fjnicco ← New User  
ENTER PASSWORD:

.#####  
FILES: 002 RDR, NO PRT, NO PUN  
LOGON AT 13:53:08 CDT TUESDAY 07/27/82  
MIDWEST S+E COMPUTER CENTER

.  
Y (19E) R/O  
CMSZER SYSTEM NAME 'CMSZER' NOT AVAILABLE.  
CMSSEG SYSTEM NAME 'CMSSEG' NOT AVAILABLE.  
R; T=0.01/0.01 13:53:28

.cp link fpkerly 191 193 rr ← Since new user is on the same computer, he can link with  
my files to copy over the necessary files.  
ENTER READ PASSWORD:  
.#####  
R; T=0.01/0.03 13:53:51

.access 193 g ← Used "g" Since the next command uses that filemode.  
G (193) R/O  
R; T=0.02/0.04 13:53:59

.copy menutrsf exec g1 cms exec a1 ← This action and the following command (cms copy) will copy over  
all the files required to use the menu technique.  
R; T=0.05/0.20 13:54:27

.cms copy  
COPY PROFILE EXEC G1 = = A1  
COPY VBANKNAM DATA G1 = = A1  
COPY VBANKNAM FORTRAN G1 = = A1  
COPY VBANKNAM MODULE G1 = = A1  
COPY VERTBAT EXEC G1 = = A1  
COPY VERTEDIT EXEC G1 = = A1  
COPY VERTEX EXEC G1 = = A1  
COPY VERTFREE EXEC G1 = = A1  
COPY VERTFREE FORTRAN G1 = = A1  
COPY VERTFREE MODULE G1 = = A1  
COPY VERTGF5A DATA G1 = = A1  
COPY VERTGF5B DATA G1 = = A1  
COPY VERTGF5C DATA G1 = = A1  
COPY VERTGRAF EXEC G1 = = A1  
COPY VERTGRF1 EXEC G1 = = A1  
COPY VERTGRF2 EXEC G1 = = A1  
COPY VERTGRF3 EXEC G1 = = A1  
COPY VERTGRF4 EXEC G1 = = A1  
COPY VERTGRF5 EXEC G1 = = A1  
COPY VERTG5A DATA G1 = = A1  
COPY VERTG5B DATA G1 = = A1  
COPY VERTG5C DATA G1 = = A1  
COPY VERT1N EXEC G1 = = A1  
COPY VERT1NDX EXEC G1 = = A1  
COPY VERT1ND1 DATA G1 = = A1  
COPY VERT1ND1 EXEC G1 = = A1  
COPY VERT1ND2 DATA G1 = = A1  
COPY VERT1ND2 EXEC G1 = = A1  
COPY VERT1ND3 DATA G1 = = A1  
COPY VERT1ND3 EXEC G1 = = A1  
COPY VERT1ND4 DATA G1 = = A1

```

COPY VERTIND4 EXEC G1 = = A1
COPY VERTIND5 DATA G1 = = A1
COPY VERTIND5 EXEC G1 = = A1
COPY VERTIND6 DATA G1 = = A1
COPY VERTIND6 EXEC G1 = = A1
COPY VERTIND7 EXEC G1 = = A1
COPY VERTINP EXEC G1 = = A1
COPY VERTNEW MODULE G1 = = A1
COPY VERTNEW1 MODULE G1 = = A1
COPY VERTPLOT EXEC G1 = = A1
COPY VERTPLOT FORTRAN G1 = = A1
COPY VERTPLOT MODULE G1 = = A1
COPY VERTPLT EXEC G1 = = A1
COPY VERTPLT1 EXEC G1 = = A1
COPY VERTPLT2 EXEC G1 = = A1
COPY VERTPLT3 EXEC G1 = = A1
COPY VERTPLT4 EXEC G1 = = A1
COPY VERTREAD EXEC G1 = = A1
COPY VERTRUN EXEC G1 = = A1
COPY VERTTELE DATA G1 = = A1
COPY VERTTELW DATA G1 = = A1
COPY VERTTERM EXEC G1 = = A1
COPY VERTTEST EXEC G1 = = A1
COPY VERTTEXT DATA G1 = = A1
COPY VICO30P1 DATA G1 = = A1
COPY VILTUGNO DATA G1 = = A1
COPY VILTUGN1 DATA G1 = = A1
COPY VPECPT2R DATA G1 = = A1
COPY VPLTUGN1 DATA G1 = = A1
COPY VTITLE DATA G1 = = A1
21 COPY VTITLE FORTRAN G1 = = A1
COPY VTITLE MODULE G1 = = A1
R; T=4.22/14.62 14:00:30

```

This command evokes the User's Profile (Profile Exec A1)

```

profile ←
DASD 291 DEFINED
'19E' REPLACES ' Y (19E) '
Y (19E) R/O
C (193) R/O
193 ALSO = G-DISK
FILE NOT FOUND. DISK ' E (194) ' WILL NOT BE ACCESSED ←
R;

```

The Second Disk (194 W) Has not been formatted.  
The following commands will do this.

```

query disk
LABEL CUU M STAT CYL TYPE BLKSIZE FILES BLKS USED-(%) BLKS LEFT BLK TOTAL
FJNICC 191 A R/W FB 3370 1024 70 1597-80 403 2000
LONNIE 5FF D/A R/O FB 3370 1024 92 3937-98 63 4000
MNT190 190 S R/O FB 3370 1024 192 13454-63 8050 21504
DMP291 291 T R/W FB 3370 1024 0 4- 0 1996 2000
MNT19E 19E Y R/O FB 3370 1024 595 28561-57 21439 50000
R;

```

```

.format 194 w Formatting the 194 W Disk
DMSFOR603R FORMAT WILL ERASE ALL FILES ON DISK 'W(194)'. DO YOU WISH TO CONTINUE? (YES|NO):
.yyes
DMSFOR605R ENTER DISK LABEL:
.awc
FORMATTING DISK 'W'.
'2000' FB-512 BLOCKS FORMATTED ON 'W(194)'.
R;

```

```

.dirm mdisk
DVHDIRO22R ENTER VIRTUAL DISK ADDRESS:
.194
DVHDIRO23R ENTER NEW ACCESS MODE, = FOR NO CHANGE, OR ? FOR MORE INFO.
.mw Establishing the 194 W Disk as Multi-Access Mode
DVHDIRO24R DO YOU WANT OTHERS TO BE ABLE TO LINK TO THIS DISK IN R/O MODE? IF
NOT, ENTER A BLANK (ANY PASSWORDS NOW SET WILL BE DELETED). IF YES,
ENTER PASSWORD, OR = TO RETAIN CURRENT VALUE.

```

```

.#####
DVHDIRO25R DO YOU WANT OTHERS TO BE ABLE TO LINK TO THIS DISK IN WRITE MODE?
IF NOT, ENTER A BLANK (WRITE AND MULTI PW'S WILL BE DELETED). IF
YES, ENTER PASSWORD, OR = TO RETAIN CURRENT VALUE.

```

```

.#####
DVHDIRO26R DO YOU WANT OTHERS TO BE ABLE TO LINK TO THIS DISK IN MULTI MODE?
IF NOT, ENTER A BLANK. IF YES, ENTER PASSWORD, OR = TO RETAIN
CURRENT VALUE.

```

```

.#####
DVHDIRO05R ENTER CURRENT CP PASSWORD TO VALIDATE COMMAND OR A NULL TO EXIT:
.#####
DVHDIRO07I DIRECTORY CHANGE NOT EFFECTIVE UNTIL SOURCE UPDATED AND ONLINE.
R;

```

```

.dirm storage 2m This Command is Required for Using TELLAGRAF
DVHMCB075I COMMAND DIRM MDISK : SOURCE UPDATED AND CHANGE ONLINE.

```

```

DVHDIRO05R ENTER CURRENT CP PASSWORD TO VALIDATE COMMAND OR A NULL TO EXIT:
.#####
DVHDIRO07I DIRECTORY CHANGE NOT EFFECTIVE UNTIL SOURCE UPDATED AND ONLINE.
R;

```

```

.edit profile exec The following CMS Edit Commands strip from the New User's Profile Inappropriate Records
DVHMCB075I COMMAND DIRM STORAGE : SOURCE UPDATED AND CHANGE ONLINE.
XEDIT:
./5ff
CP LINK LSECO 191 5FF RR
.de12
./193
ACCESS 193 C
.del
.top
TOF:

```



FIGURE 1 (continued)

Users 194 W Disk. The 194 W  
Disk is shown here as 194 E/A  
Disk Because ("194 W") implies Read  
+ Write Capability and ("194 E/A")  
is read only capability. The menu  
technique controls this change  
automatically.

Users 191 A Disk

Access 194 W  
194 REPLACES W (194)  
R:  
Deletions are made permanent  
This Command copies the Data File used for Offline Graphing  
to the Users 194 W Disk  
Erases that file from the Users 191 A Disk

query disk  
LABEL CUU M STAT CYL TYPE BLKSIZE  
FILES BLKS USED-(%) BLKS LEFT  
2000 406  
4000 63  
21504 8050  
2000 1996  
1000 993  
50000 21439

vertex  
E (194) R/O  
MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

1 = RUN VERT ONLINE  
2 = RUN VERT OFFLINE (CMS BATCH)  
3 = VIEW VERT OUTPUT  
4 = CREATE A VERT INPUT FILE  
5 = EDIT AN EXISTING VERT INPUT FILE  
6 = GET VERT NETWORK PLOT MENU  
7 = GET VERT GRAPH MENU  
LIST = GET VERT DATASETS DISPLAY LISTING MENU  
END = END THE SESSION  
end  
R:

disk  
LABEL CUU M STAT CYL TYPE BLKSIZE  
FILES BLKS USED-(%) BLKS LEFT  
2000 406  
4000 63  
21504 8050  
2000 1996  
1000 993  
50000 21439

VERTEX EXEC A1  
E (194) R/O

MAIN MENU LEVEL: ENTER THE OPTION DESIRED .

- 1     = RUN VERT ONLINE
- 2     = RUN VERT OFFLINE (CMS BATCH)
- 3     = VIEW VERT OUTPUT
- 4     = CREATE A VERT INPUT FILE
- 5     = EDIT AN EXISTING VERT INPUT FILE
- 6     = GET VERT NETWORK PLOT MENU
- 7     = GET VERT GRAPH MENU
- LIST  = GET VERT DATASETS DISPLAY LISTING MENU
- END   = END THE SESSION

VERTPLT EXEC A1  
SECONDARY MENU LEVEL, ENTER THE OPTION DESIRED ,

- 1 = CREATE A VERT PLOT DATA FILE
- 2 = EDIT AN EXISTING VERT PLOT DATA FILE
- 3 = DISPLAY A VERT PLOT
- 4 = SAMPLE VERT PLOT (TROOP SUPPORT LEVEL II MANAGED  
ROUTINE ECP PROCESS -PHASE 1)
- R = RETURN TO THE MAIN MENU LEVEL
- END = END THE SESSION

VERTGRAF EXEC A1

SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = DISPLAY VERT GRAPHICS DATA FILES USING TELEGRAF BANKDATA FILES
- 2 = CREATE A VERT GRAPHICS DATA FILE
- 3 = EDIT AN EXISTING VERT GRAPHICS DATA FILE
- 4 = DISPLAY A VERT GRAPHICS DATA FILE WHICH WAS CREATED MANUALLY
- 5 = SAMPLE VERT GRAPHS (SCHEDULE, COST, AND PERFORMANCE CHARTS  
FOR THE COBRA FACTS DRA)
- R = RETURN TO THE MAIN MENU LEVEL
- END = END THE SESSION

VERTINDX EXEC A1

SECONDARY MENU LEVEL, ENTER THE OPTION DESIRED ,

- 1 = DISPLAY A LISTING OF VERT EXECUTIVE PROCEDURES
- 2 = DISPLAY A LISTING OF VERT SOURCE PROGRAMS
- 3 = DISPLAY A LISTING OF VERT INPUT DATA FILES
- 4 = DISPLAY A LISTING OF VERT OUTPUT DATA FILES
- 5 = DISPLAY A LISTING OF VERT GRAPHICS DATA FILES
- 6 = DISPLAY A LISTING OF VERT PLOT PREVIEW DATA FILES
- 7 = GET LISTING MENU FOR EDITING THE ABOVE DATA FILES
- R = RETURN TO THE MAIN MENU LEVEL
- END = END THE SESSION

VERTIND7 EXEC A1

TERTIARY MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = EDIT THE LISTING OF VERT EXECUTIVE PROCEDURES
- 2 = EDIT THE LISTING OF VERT SOURCE PROGRAMS
- 3 = EDIT THE LISTING OF VERT INPUT DATA FILES
- 4 = EDIT THE LISTING OF VERT OUTPUT DATA FILES
- 5 = EDIT THE LISTING OF VERT GRAPHICS DATA FILES
- 6 = EDIT THE LISTING OF VERT PLOT PREVIEW DATA FILES
- R = RETURN TO THE MAIN MENU LEVEL
- S = RETURN TO THE SECONDARY MENU LEVEL
- END = END THE SESSION

FILE: VPECPT23.DAT

Lower left-hand X corner

Lower left-hand Y corner

node width

node height

MIDWEST STATE COMPUTER CENTER

Data is in inches

PAGE 001

| GROUP    | SUPPORT | LEVEL | ROUTINE | PHASE | ECP PROCESS                                |
|----------|---------|-------|---------|-------|--|
| NUDE0.   | 4.00    | 1.    | 1.2     | 1     | 2ECP RECEIVED IN DRSTS-MPC                 |
| NUDE5.5  | 4.00    | 1.    | 1.      | 2     | 2ECP REVIEW COMPLETED                      |
| NUDE11.0 | 4.00    | 1.    | 1.      | 2     | 2ECP RECEIVED BY ELEMENTS                  |
| NUDE16.5 | 4.00    | 1.    | 1.      | 2     | 2COMMENTS COMPLETED BY ELEMENTS            |
| NUDE22.0 | 3.50    | 1.    | 2.      | 2     | 2COMMENTS RECEIVED BY DRSTS-MPC            |
| NUDE27.5 | 2.00    | 1.    | 5.      | 2     | 3CONFIG CONTROL BOARD MEETS                |
| NUDE33.0 | 6.0     | 1.    | 1.      | 2     | 1ECP APPROVED                              |
| NUDE33.0 | 4.0     | 1.    | 1.      | 2     | 1ECP DECISION DEFERED                      |
| NUDE33.0 | 2.0     | 1.    | 1.      | 2     | 1ECP DISAPPROVED                           |
| ARC 1.   | 4.5     | 5.5   | 4.5     | 0     | 01001T2R 2 - 4 DAYS                        |
| ARC 1.   | 4.2     | 5.5   | 4.2     | 1     | 1DRSTS-MPC IDENTIFIES T, L, & P            |
| ARC 6.5  | 4.5     | 11.0  | 4.5     | 0     | 01005T2R 4 - 6 DAYS                        |
| ARC 6.5  | 4.2     | 11.0  | 4.2     | 1     | 1DRSTS-MPC SENDS ECP TO ELEMENTS           |
| ARC 12.0 | 4.5     | 16.5  | 4.5     | 0     | 01007T2R 15 DAYS                           |
| ARC 12.0 | 4.2     | 16.5  | 4.2     | 1     | 1ELEMENTS REVIEW & PROVIDE COMMENTS        |
| ARC 17.5 | 4.5     | 22.0  | 4.5     | 0     | 01008T2R 3 - 5 DAYS                        |
| ARC 17.5 | 4.2     | 22.0  | 4.2     | 1     | 1ELEMENTS SEND COMMENTS TO DRSTS-MPC       |
| ARC 23.0 | 4.0     | 27.5  | 4.0     | 0     | 01013T2R 11 - 13 DAYS                      |
| ARC 23.0 | 3.7     | 27.5  | 3.7     | 1     | 1DRSTS-MPC SCHEDULES CC BOARD MEETING      |
| ARC 23.0 | 5.0     | 27.5  | 5.0     | 0     | 01009T2R 4 - 6 DAYS                        |
| ARC 23.0 | 4.7     | 27.5  | 4.7     | 1     | 1DRSTS-MPC COMPILES COMMENTS & SENDS TO CM |
| ARC 28.5 | 2.5     | 33.0  | 2.5     | 0     | 01017T2R 1 DAY <.15>                       |
| ARC 28.5 | 2.2     | 33.0  | 2.2     | 1     | 1BOARD DISAPPROVES ECP                     |
| ARC 28.5 | 4.5     | 33.0  | 4.5     | 0     | 01016T2R 1 DAY <.25>                       |
| ARC 28.5 | 4.2     | 33.0  | 4.2     | 1     | 1BOARD DEFERS DECISION ON ECP              |
| ARC 28.5 | 6.5     | 33.0  | 6.5     | 0     | 01015T2R 1 DAY <.60>                       |
| ARC 28.5 | 6.2     | 33.0  | 6.2     | 1     | 1BOARD APPROVES ECP                        |
| END      |         |       |         |       |  |

Repeat Factor (Number of times the plot will be overdrawn)

Long arc name NOTE: The long arc name is created as a separate arc in which the arc line and arrowhead are not drawn. It is placed .9 of an inch below the arc which it describes.

Time required to perform the arc (activity)

Abbreviated arc name

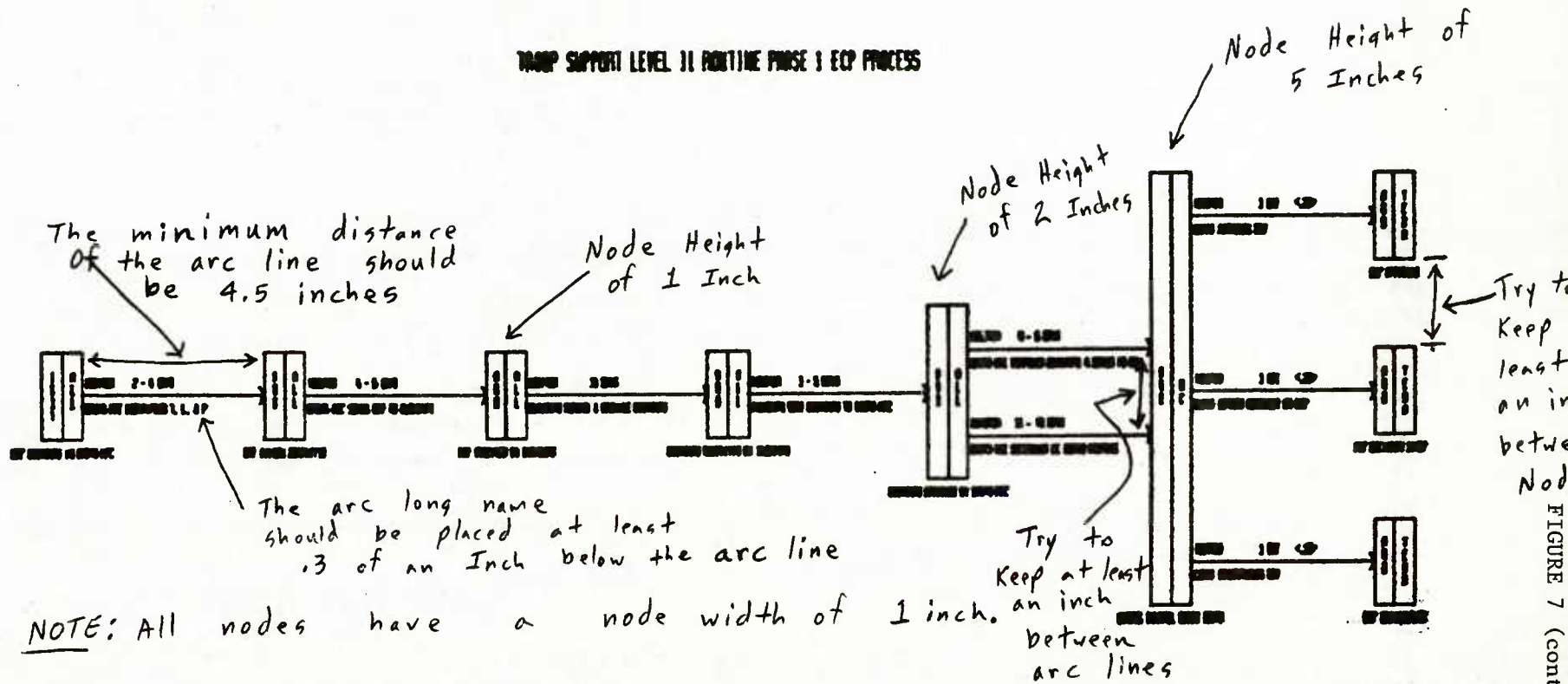
Probability of the arc's occurrence

### NOTES:

1. Arcs and Nodes do not have to be entered as separate groups. Some people find it easier to input the file this way; others prefer to intersperse the arcs and nodes.
2. All Real Data is in inches.
3. A node width of one inch is usually sufficient
4. Vary the node height with the number of arcs coming in or going out from it. This method maximizes the number of horizontal arcs in the network.
5. See attached plot of this data file (Next Page).



## TRAMP SUPPORT LEVEL 31 ROUTINE PHASE 3 ECP PROCESS



APPENDIX A

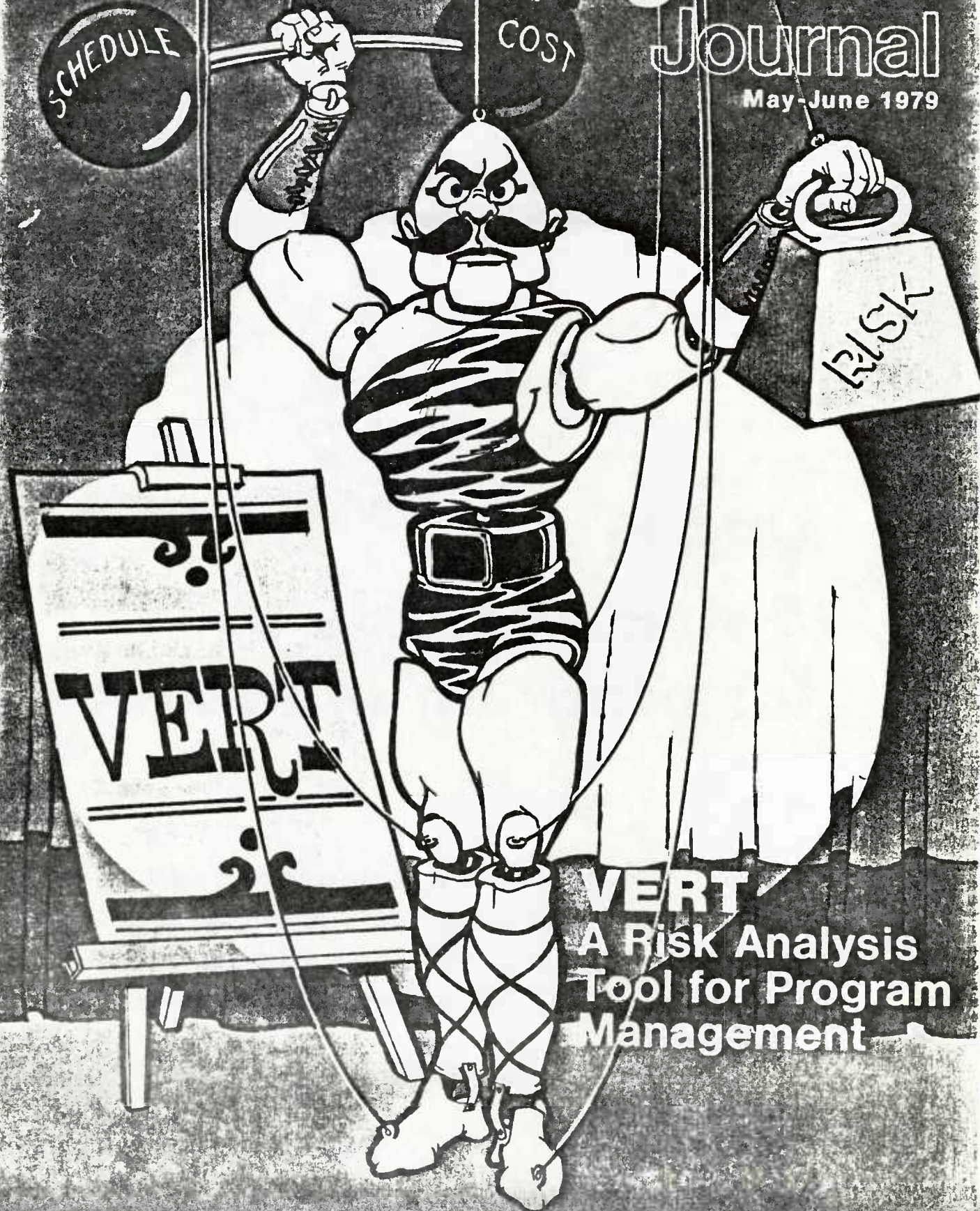
A COPY OF A JUNE 1979 DEFENSE MANAGEMENT JOURNAL

ARTICLE ON VERT



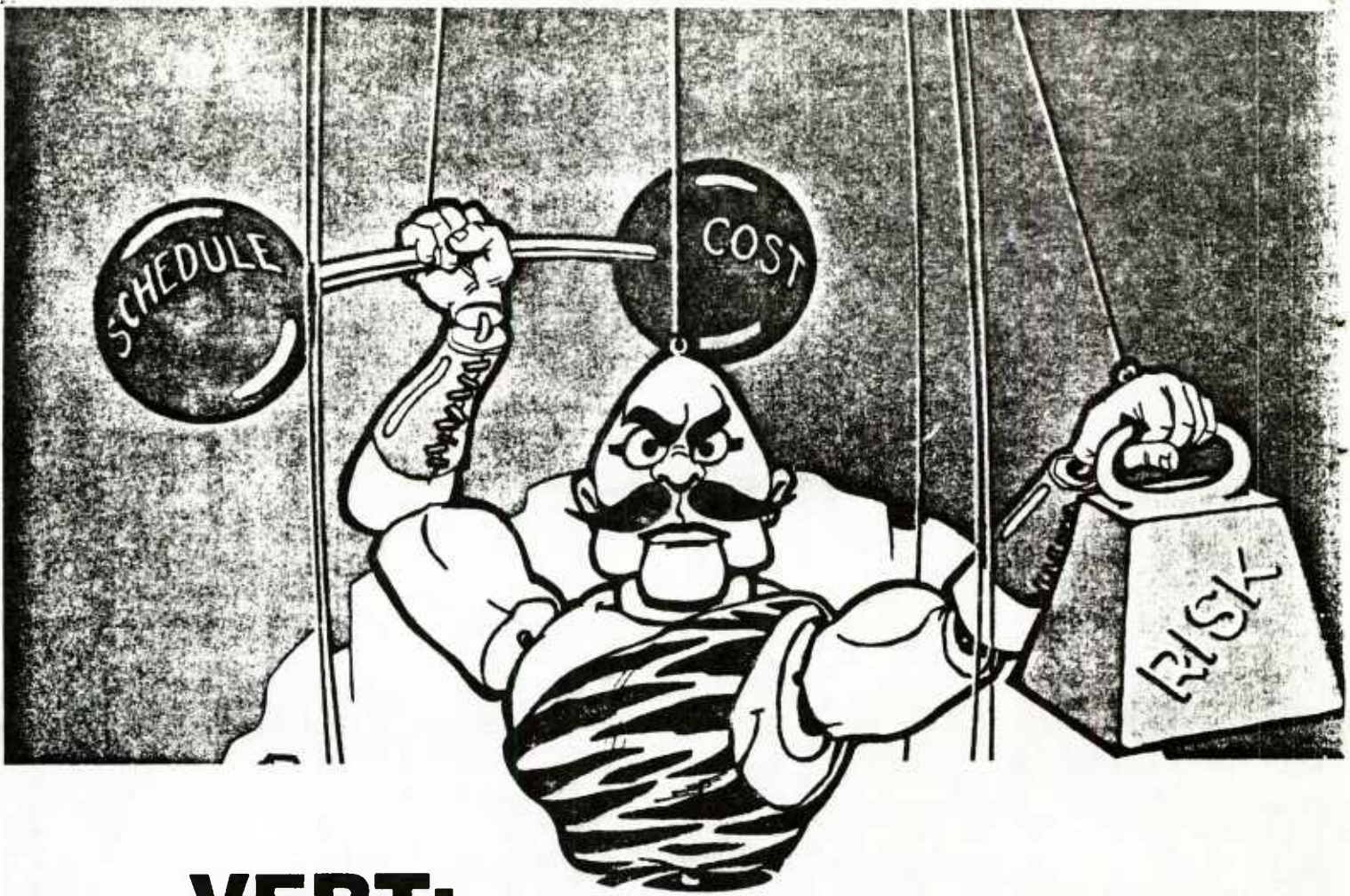
# Defense Management Journal

May-June 1979



**VERT**  
A Risk Analysis  
Tool for Program  
Management





# **VERT: A risk analysis tool for program management**

By Major Greg A. Mann, USAF

***So far, it has not taken a strong hold, but the Venture Analysis and Review Technique is proving its value for program managers who need to assess the risk of changes in cost, schedule, or specifications.***

The weapons-system acquisition process has been subject to a great deal of criticism in the last decade. Poor forecasting has contributed to cost and schedule overruns which often affect our national defense capabilities and create adverse public opinion.<sup>1</sup> Faced with public and Congressional scrutiny, managers can no longer fall back on "cost growth" as an excuse for such overruns, and will be tasked more than ever to buy the best available system for the least possible cost within the prescribed time frame. For each program decision, the program manager must determine the best balance among three parameters: cost, schedule, and performance. In the weapons-system acquisition process, as contrasted with other areas of management, such determinations are more frequent and more complex, and are made with less of the essential information.<sup>2</sup> This is because of the inherent uncertainty involved in identifying and resolving the technological unknowns of developing programs.

Uncertainty creates risk,<sup>3</sup> but risk can be controlled to some extent by risk analysis. In particular, one recently developed quantitative risk-analysis method, the Venture Evaluation and Review Technique, is proving to be a powerful program-management tool and has been applied satisfactorily to several system-development programs.

## Background

Studies of weapons-development projects indicate that most cost and time estimates made early in the acquisition cycle eventually prove to be lower than the actual cost and time for development. This cost growth and time delay can be attributed principally to two factors of the initial estimates.<sup>4</sup> First, the inability to accurately predict inflationary trends creates an inherent cost-estimating error. This error, however, tends to be small in relation to the second factor—requirements errors, which result from contractual changes in the scope of work. As a project develops, operational considerations and technical innovation necessitate changes in performance specifications, which in turn affect the schedule and cost. Such changes are most pronounced in a technically complex research and development project. A RAND Corporation study found that requirements uncertainty contributes as much as 30 percent to the variations in cost estimates.<sup>5</sup>

These technical-requirements errors, schedule overruns, and cost overruns, together with the rapid increase in the potential enemy's technical capability, influenced DoD's decision in 1970 to accomplish formal risk analysis as an integral part of the development process.<sup>6</sup> This directive raises a question: how is the program manager to implement formal risk analysis?

Risk analysis is not new. It has always been conducted to varying degrees, based on subjective judgment, experience, and qualitative inputs. Over the past 20 years, numerous risk-analysis techniques have been developed. However, most risk analyses are intuitive and incomplete: intuitive in that the structured quantitative approach often gives way to hunches and blackboard analysis; incom-

plete in that detailed analyses of isolated aspects of the problem are rarely integrated into a comprehensive analysis.

Because the three parameters of cost, time, and performance are highly interrelated, it is impossible to work with each factor independently without introducing errors.<sup>7</sup> But past techniques could not mathematically represent the three parameters and their interrelationships in a way that provided the program manager with accurate risk information on all three parameters simultaneously.

Furthermore, in the past, military procurement of major weapon systems often sacrificed the cost and schedule parameters in order to maintain prescribed performance requirements. In the 1960s attempts to alleviate the imbalance led to changes in procurement strategy. Today, top managers in the Air Force Systems Command consider cost to be as important as schedule and performance.

As this change in emphasis was evolving, decision-management techniques were also changing. The Critical Path Method and the Program Evaluation and Review Technique were developed in the late 1950s. These original networking techniques were useful in the basic managerial functions of planning, scheduling, and controlling. They were also beneficial in laying out tasks and in making gross estimates for material, equipment, and manpower. However, both techniques assumed unrealistically that all activities would be completed successfully.

In the mid-1960s, the Graphical Evaluation and Review Technique was developed as the first computer-oriented networking methodology. From this evolved the Mathematical Network Analyser, developed by the U.S. Army. MATHNET provided the capability for events, activities, activity times, and cost to be modeled probabilistically.

This program was subsequently modified by Army Logistics Management Center personnel and renamed the Risk Information System and Cost Analysis. RISCA provides for the analysis of event uncertainty, but it does not evaluate the risk of failing to attain the performance

<sup>1</sup> Herbert L. Bevelhimer, *A Proposed Methodology for Weapon Systems Development Risk Analysis, thesis, Wright-Patterson Air Force Base, Ohio: Air Force Institute of Technology, June 1973, p. 2.*

<sup>2</sup> *Ibid.*

<sup>3</sup> For purposes of this article, risk will be defined as the "probability of not being able to acquire a weapon system of specified performance characteristics within an allotted time, under a given cost and by following a specific course of action." R.R. Lochry et al., *Final Report of the USAF Academy Risk Analysis Study Team, Denver, Colorado: U.S. Air Force Academy, August 1971.*

<sup>4</sup> *Ibid.*

<sup>5</sup> Fisher, G.H., *A Discussion of Uncertainty in Cost Analysis, The Rand Corporation, April 1962.*

<sup>6</sup> *Deputy Secretary of Defense Memorandum, May 28, 1970, subject: Policy Guidance on Major Weapon System Acquisition.*

<sup>7</sup> Hamilton T. Lenox, *Risk Analysis, thesis, Wright-Patterson Air Force Base, Ohio: Air Force Institute of Technology, June 1973, p. 71.*



## **VERT: a risk analysis tool**

objectives. Thus there was still a need to include the performance variables in the total risk-analysis methodology. This was accomplished in 1973 with the development of the Venture Evaluation and Review Technique. Since then, VERT has been used almost exclusively by Army program managers, who have accepted it as a flexible and valuable tool.<sup>8</sup>

The Venture Evaluation and Review Technique uses a network-simulation approach. In brief, this approach determines risk analysis through two steps. The first step entails constructing a graphic representation of the network—the ordered series of activities leading to specific events. The second step consists of analyzing that network using a computer program. The following example illustrates the process.

The F-X, a hypothetical fighter under development, has three major components: an airframe, an engine, and an avionics system. The desired course of action is to build each subsystem concurrently and integrate them later. A model of the essential features of this process as applied to the F-X is depicted in the Figure. The nodes (decision points) in the network represent alternatives which determine the next arc (activity) to be undertaken in the network. Additionally, the size of the problem has a bearing on how the network is structured. If the problem is large and complex, it is often advisable to construct lower level networks or subnetworks of major subsystems.<sup>9</sup>

Once developed, the network is converted to VERT program terminology. The program has a variety of input capabilities that make it possible for decision events and activities occurring in the network to be described. Numerical values for an activity's time, cost, and performance are assigned to each arc. At each node the next arc is determined by probabilities or by some criteria specified by a mathematical relationship.

The process involves a Monte Carlo simulation in which the design of a network flow across the entire network or subnetwork from the beginning to an appropriate end point leads to a trial solution of the problem being modeled. On the F-X fighter, for example, simulation could assess the activity flow across the total development program, or could focus on the flow across the wing-development subnetwork.

The process is repeated as many times as requested by the user in order to create a large sample of possible outcomes. Slack time, completion time, cost, and performance results are generated as output data for each node. A relative frequency distribution depicts the range

and concentration of values observed at a given node. Also, the probability of exceeding certain value levels can be obtained from the cumulative frequency distributions, and confidence levels can be inferred.

The computer program produces pictorial histogram approximations for selected nodes. Thus, a program manager would have an integrated risk analysis for a particular point of interest in his program. For example, the analysis of the cost, schedule, and performance risk for the F-X program with respect to meeting the scheduled Defense Systems Acquisition Review Council milestones could be expressed in the following manner.

**Schedule Risk.** The probability or confidence level of being within eight weeks of the scheduled DSARC is 90 percent; the probability of a schedule overrun of 20 weeks or more is 5 percent.

**Cost Risk.** The total cost of the program will be within \$100 million of the target cost, with a 90 percent confidence level; there is only a 5 percent probability of a cost overrun exceeding \$225 million.

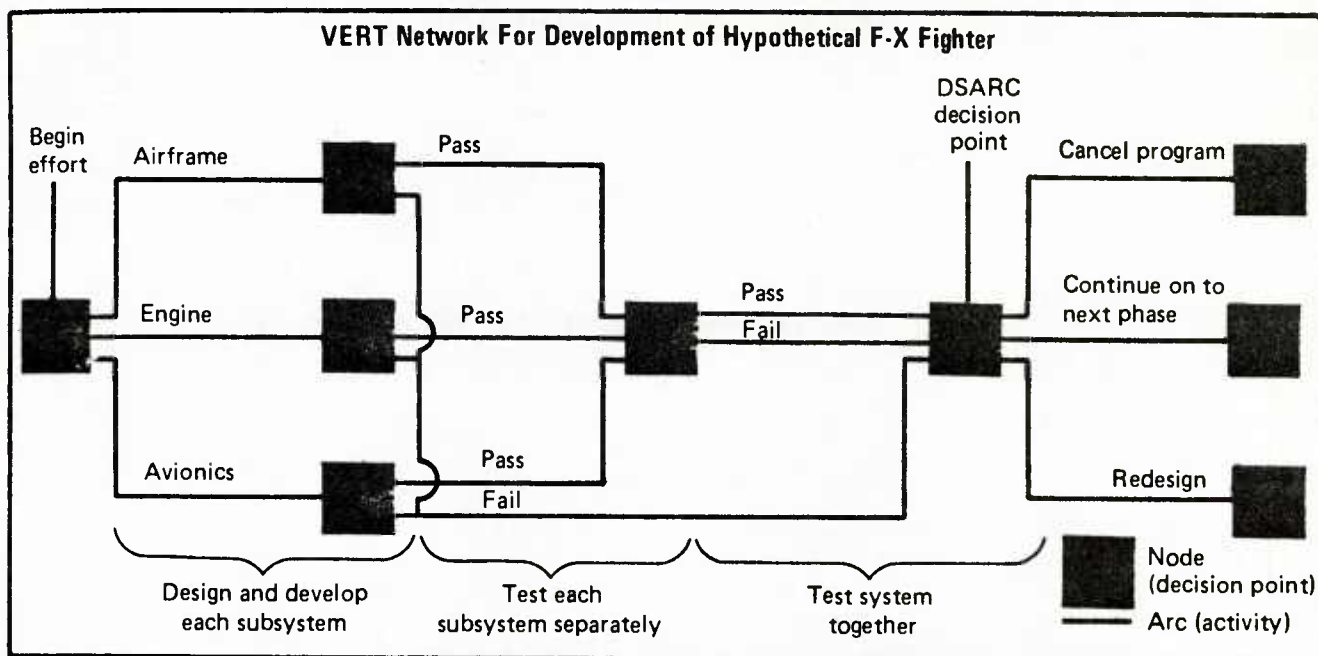
**Performance Risk.** The confidence level of being within 500 pounds of the static sea-level thrust specifications is 90 percent; performance risk could be indexed to other specifications such as speed, weight, reliability, and maintainability.

The conclusions of the above analysis could vary as key input parameters change. By modifying the values of the input data, one can easily rerun the model. This sensitivity-analysis capability provides the decision maker with the answers to many hypothetical questions. For example, what if the delivery of critical avionics components on the F-X were to take three weeks longer than originally expected? This contingency could be evaluated quickly. By substituting the "what if" data and rerunning the simulation, the decision maker is provided with new information. Although the program manager is the ultimate user of the VERT analysis, the majority of simulations have been developed and run by the systems analysis or program control offices supporting the manager. Yet VERT is not a difficult risk-analysis technique requiring the services of a computer programmer or systems analyst. All that is needed is an individual who is familiar with basic mathematics and computer programming and who can devote about a week of continuous study and effort to master the model's capabilities.<sup>10</sup> However, such proficiency would be required only in simulating the most complex or unusual risk situations. The extent to which a project needs to be segmented into activities and events is a function of the available data and the results desired. Breaking down complex situations into subnetworks simplifies the programming greatly. Some managers

<sup>8</sup> T.N. Thomas, *VERT: A Risk Analysis Technique for Program Managers*, Defense Systems Management College, May 1977, p. 21.

<sup>9</sup> Gerald Moeller, *VERT Documentation*, Rock Island, Illinois: U.S. Army Armament Command, 1976. Moeller developed VERT in 1973.

<sup>10</sup> *Ibid*, p. 4.



prefer to estimate parameters for the smaller elemental items rather than for the entire system or for higher-level work packages.

If the results achieved in the analysis are not satisfactory, the program manager must analyze the situation and come up with results that agree with his subjective judgment. When the proper relationships are determinable and mathematically tractable, most analysts and decision makers prefer the quantitative approach.<sup>11</sup> In the VERT network-analyzer program, emphasis must be placed on establishing proper relationships. Actual conditions must be represented if creditable analytical results are to be produced. The desire for a quantitative answer or analysis should not force the analyst to disregard or alter critical relationships or facts. The analyst must recognize not only his own limitations but those of VERT as well.

### Program applications

The Venture Evaluation and Review Technique has been used in support of several Army programs and at least one Navy project. One of the most noteworthy applications of VERT occurred during the 1975 demonstration and validation phase of the Army's XM-1 Tank development program. The study was structured to examine the XM-1 program manager's question: given a decision to proceed into full-scale engineering development, what is the risk of experiencing unfavorable schedule, cost, or system performance variances? The study was refined to address the following specific objectives:

- Schedule risk expressed as a time distribution for meeting the Army System Acquisition Review Council milestone.

- Cost risk expressed as cost-variance distributions derived from schedule analysis.

- Performance risk expressed as the probability of experiencing a hardware problem that would significantly delay completion of the test program.

VERT simulation was also used in the Cannon-Launched Guided Projectile program to examine the probability that the development effort would successfully reach the production phase. The simulation indicated that there was a 95 percent probability of at least one manufacturer qualifying for full production. It also indicated that the total cost of the program would run about \$9 million over baseline cost if there were a 9-month extension in the schedule.<sup>12</sup>

The technique has also been used in support of the Army's Platoon Early Warning System, the M110E1 self-propelled howitzer, and the Advanced Attack Helicopter program. On the helicopter program, VERT was used to evaluate the validation-phase schedules through the second Defense Systems Acquisition Review Council milestone. At this early stage of development there was considerable risk in many areas. The analysis allowed early identification of possible impacts caused by activities having high probabilities of not occurring as planned. The benefits were so great that the program manager requested continuous tracking of the program by VERT simulation.

To explore the capabilities of the risk-assessment technique, the Navy ran a test application of VERT on the radar system for the F-18 aircraft. The risks were related to new performance requirements, and the simulation examined the amount of testing to be conducted in the laboratory versus aboard a flight-test aircraft. Again, the

<sup>11</sup> Lenox, p. 72.

<sup>12</sup> James B. Besson, *Risk Analysis of the 155MM Cannon-Launched Guided Projectile*, Rock Island, Illinois: U.S. Army Armament Command, 1976, p. 4.



## **VERT: a risk analysis tool**

analysis provided the program manager with valuable information.

### **Problems with VERT**

Some minor problems have arisen with VERT, but none are considered major obstacles to its effective use. The most frequent problem is related to the collection of data needed to describe the probabilistic behavior of the variables of time, cost, and performance. Although the VERT program is capable of using many different distributions, most data are represented by a triangular distribution indicating, for example, most pessimistic, most likely, and most optimistic. This is not necessarily wrong, but it does not really use the capabilities of the model, and it thus reduces the accuracy of the simulation output.<sup>13</sup>

Another common data problem is the inability to obtain from the experts accurate estimates of the time and cost. The experts tend to be overly optimistic in their estimates, but this problem is waning as they are coming to realize that the data are being used only for a risk-analysis simulation and will not cause them embarrassment by appearing in other documents.

### **More can be done**

Although VERT appears to be quite promising and devoid of major problems, it has not enjoyed wide use. One reason for this lies not with VERT, but with the inadequate understanding of risk-analysis concepts in general.<sup>14</sup> Many program managers are handicapped by a lack of familiarity with quantitative risk-assessment techniques, and few people in the military services are experienced enough to perform the analysis. In Air Force acquisition programs, for example, such techniques have not been used. Similarly, few managers are accustomed to using the outputs of a risk analysis. For instance, probability distributions depict the risk of development more accurately than do point estimates; yet there is widespread resistance to probability distributions because of their unfamiliarity.<sup>15</sup>

Consequently, an education program is needed to instruct analysts and managers in the preparation and use of formal, quantitative risk analysis. The program needs to be designed to emphasize risk analysis for high-level officials who deal with uncertainties in program management and program approval.

Another reason that VERT is not used often is the systems-acquisition community's failure to publicize or offer significant training in VERT. Consequently, program-management personnel are unaware of the technique and its possible applications in the program-development environment. The Army recognized this shortfall and started a comprehensive course of instruction on risk-analysis techniques, primarily oriented toward the RISCA methodology. Now, because of increasing interest and confidence in VERT, the Army Logistics Management Center intends to emphasize it in advanced risk-analysis courses.

Yet another reason VERT is not used more frequently is the problem of limited numbers of personnel and a high rate of personnel turnover in program offices. No agency outside the program office can effectively perform a risk analysis of that program, since only the program office has the necessary data to work with the program manager and has access to him in selecting alternative courses of action. Thus, a risk-analysis team is needed at the product-division staff level to provide the corporate memory necessary to implement a quantitative risk analysis. This team would marry the mechanics of VERT with the data source in the program office.

As the use of VERT increases, knowledge of its applications will grow. Further applications and research are necessary to confirm its validity as a risk-assessment technique. Users need to be encouraged to express their reactions to the technique. These reactions should be analyzed to ascertain the actual benefits being achieved. This investigation could lead to the development of a data bank to determine the degree to which actual program events were substantiated by the model's predictions.

The Venture Evaluation and Review Technique is not necessarily better than any other technique, but it does provide the program manager an accessible tool for integrating cost, schedule, and performance parameters. With VERT, the program manager can add a new dimension to the analysis of program decisions, improving the perspective on alternative courses of action. **DMJ**

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<sup>13</sup> Thomas, p. 17.

<sup>14</sup> Lochry, p. 107.

<sup>15</sup> *Ibid.*

APPENDIX B

REPLACEMENT PAGE FOR VERT DOCUMENTATION

1. Full value the partially completed activities.
2. Partial value the partially completed activities.
3. Pruning the uninitiated activities.
4. Full value the unitiated activities.

| <u>Option No.</u> | <u>Field Entry</u> | <u>Preceding Computations Used</u> |
|-------------------|--------------------|------------------------------------|
| 1.                | 0 or blank         | 1 and 3                            |
| 2.                | 1                  | 2 and 3                            |
| 3.                | 2                  | 1 and 4                            |

Col. 5, Format II. Full print trip option. Entering a "1" in this column requires a card to be entered following the problem identification card which carries the names of arcs and/or nodes. When any of these arcs or nodes are active, the program will list all the arcs or nodes which were active for the given iteration.

Col. 6, Format II. Correlation computation and plot option. Entering a "1" in this column requires a card to be entered following the full print trip option card, which carries the correlation and plot combinations wanted for terminal nodes.

Col. 7, Format II. Cost-performance time interval option. Entering a "1", "2", or "3" in this column requires entering cards following the correlation computation and plot option card which carries the time intervals and possible upper and lower boundaries for the histograms used to plot the cost incurred and/or performance gained during these time intervals. Entering a "1" in this column indicates that cost only is desired, while entering a "2" indicates that performance only is desired. If both cost and performance are desired, a "3" should be entered in this column.

Col. 8, Format II. Composite terminal node minimums and maximums option. Entering a "1" in this column requires a card to be entered following the time interval costing option cards which carries the minimums and maximums used to print the time, path cost, overall cost and performance for the composite terminal node.

Col. 9, Format II. Entering a "1" will evoke the mean print option. Otherwise, leave blank.

Col. 10-20, Format III. Enter the value initially assigned to the seed of the uniform (0.0 to 1.0) random number generator. The ending value of the seed is printed out at the end of each problem. If this field is left blank or has a "0" entered in it, the seed will be loaded with the value of 435459. Further, when running a series of problems via a single computer run, the program will carry the seed forward to subsequent problems providing this field is left blank in those subsequent problems. There is provision in VERT for embedding two generators, rather than just one uniform random number generator. If the seed is prefixed with a minus (-) sign, the sign will be stripped off the seed and generator number two will be used



for the given problem. If the seed is prefixed with a plus (+) sign or no sign, the seed will be used as is and the generator number one will be employed for the given problem.

Cols. 21-24, Format I5. Enter the number of iterations desired for this problem.

Cols. 25-28, Format F4.2. Enter the yearly interest rate used for inflating cost and/or performance values for specific arcs as called out by the user. This number should be entered in percentage form. For example, 7.5 percent should be entered in columns 25-28 as 7.5. If none of the cost and/or performance values of the arcs in the network being processed require discounting, leave this field blank.

Cols. 29-32, Format F4.2. Enter the yearly interest rate used to discount cost and/or performance values for specific arcs as called out by the user. This number should be entered in percentage form similar to the preceding field. If none of the cost and/or performance values of the arcs in the network being processed require discounting, leave this field blank.

Note: The inflation and discounting calculations are made immediately after generating the time, cost and performance values for a given arc. These values are then stored in place of the original values and then used in all future mathematical relationships. However, when the time, cost and performance values for a given arc are interrelated, then the original unadjusted cost and/or performance values are used in the mathematical relationships to calculate values for the dependent variables.

Cols. 33-35, Format F3.2. Enter the time factor which converts the program time to a yearly basis. This program computes interest calculations on a yearly basis. This field carries the number of time units existing in the network time domain in one year. For example, if the network time is in months, a 12. should be entered in columns 33-35. Leave this field blank if the preceding two fields are blank.

Note: Values assigned to the following three fields must all lie within either the closed interval of -1.0 and 0.0 or the closed interval of 0.0 and +1.0. These fields must not jointly carry positive and negative values (i.e., field 1 cannot have a positive entry while fields 2 and/or 3 have negative entries). Entering positive values in these fields will give rise to choosing the terminal node with the least time and cost and the most performance combination as the optimum terminal node. Entering negative values in these fields will cause the terminal node with the largest time and cost and the least performance to be chosen as the optimum terminal node. For further information regarding winning terminal node selection, see the description of the terminal output logic (cols. 10-12 of section D1).

Cols. 36-38, Format F3.2. Enter the weight assigned to time when determining the optimum terminal node.

APPENDIX C

ALPHABETICALLY ORDERED LISTING OF DATA FILES

USED BY THE MENU TECHNIQUE

|          |       |    |
|----------|-------|----|
| TAGPRO   | DATA  | A1 |
| TAGPRO   | 4014  | A1 |
| TAGPRO   | 4027  | A1 |
| VOUTPUT  | AAAA  | A1 |
| VERT1    | AAAA  | A1 |
| VERT2    | AAAA  | A1 |
| VERT3    | AAAA  | A1 |
| VERT4    | AAAA  | A1 |
| VERTNEW  | BATCH | A1 |
| VERTNEW1 | BATCH | A1 |
| VBANKNAM | DATA  | A1 |
| VBANKNM1 | DATA  | A1 |
| VERTBAT  | DATA  | A1 |
| VERTGF5A | DATA  | A1 |
| VERTGF5B | DATA  | A1 |
| VERTGF5C | DATA  | A1 |
| VERTG5A  | DATA  | A1 |
| VERTG5B  | DATA  | A1 |
| VERTG5C  | DATA  | A1 |
| VERTIND1 | DATA  | A1 |
| VERTIND2 | DATA  | A1 |
| VERTIND3 | DATA  | A1 |
| VERTIND4 | DATA  | A1 |
| VERTIND5 | DATA  | A1 |
| VERTIND6 | DATA  | A1 |
| VERTTELE | DATA  | A1 |
| VICO30P1 | DATA  | A1 |
| VILTUGN0 | DATA  | A1 |
| VILTUGN1 | DATA  | A1 |
| VPECPT2R | DATA  | A1 |
| VPLTUGN1 | DATA  | A1 |
| VTITLE   | DATA  | A1 |
| VERTBAT  | EXEC  | A1 |
| VERTEDIT | EXEC  | A1 |

|          |         |    |
|----------|---------|----|
| VERTEX   | EXEC    | A1 |
| VERTFREE | EXEC    | A1 |
| VERTGRAF | EXEC    | A1 |
| VERTGRF1 | EXEC    | A1 |
| VERTGRF2 | EXEC    | A1 |
| VERTGRF3 | EXEC    | A1 |
| VERTGRF4 | EXEC    | A1 |
| VERTGRF5 | EXEC    | A1 |
| VERTIN   | EXEC    | A1 |
| VERTINDX | EXEC    | A1 |
| VERTIND1 | EXEC    | A1 |
| VERTIND2 | EXEC    | A1 |
| VERTIND3 | EXEC    | A1 |
| VERTIND4 | EXEC    | A1 |
| VERTIND5 | EXEC    | A1 |
| VERTIND6 | EXEC    | A1 |
| VERTIND7 | EXEC    | A1 |
| VERTINP  | EXEC    | A1 |
| VERTPLOT | EXEC    | A1 |
| VERTPLT  | EXEC    | A1 |
| VERTPLT1 | EXEC    | A1 |
| VERTPLT2 | EXEC    | A1 |
| VERTPLT3 | EXEC    | A1 |
| VERTPLT4 | EXEC    | A1 |
| VERTREAD | EXEC    | A1 |
| VERTRUN  | EXEC    | A1 |
| VERTTERM | EXEC    | A1 |
| VERTTEST | EXEC    | A1 |
| VBANKNAM | FORTRAN | A1 |
| VERTBAT  | FORTRAN | A1 |
| VERTBAT1 | FORTRAN | A1 |
| VERTFREE | FORTRAN | A1 |
| VERTNEW  | FORTRAN | A1 |
| VERTNEW1 | FORTRAN | A1 |



|          |          |    |
|----------|----------|----|
| VERTPLOT | FORTTRAN | A1 |
| VTITLE   | FORTTRAN | A1 |
| VBANKNAM | MODULE   | A1 |
| VERTBAT  | MODULE   | A1 |
| VERTBAT1 | MODULE   | A1 |
| VERTFREE | MODULE   | A1 |
| VERTNEW  | MODULE   | A1 |
| VERTNEW1 | MODULE   | A1 |
| VERTPLOT | MODULE   | A1 |
| VTITLE   | MODULE   | A1 |
| VERTTELW | DATA     | W1 |
| VERT1    | DATA     | W1 |
| VERT2    | DATA     | W1 |
| VERT3    | DATA     | W1 |
| VERT4    | DATA     | W1 |

APPENDIX D

MENU LEVEL ORDERED SOURCE LISTINGS  
OF DATA FILES USED BY THE MENU TECHNIQUE

```

&CONTROL CFF
RELEASE 194
ACCESS 194 E/A
-INIT
&GLCBAL2 = 1
&IF &GLCBAL1 = 2 &GCTC -FIN
&IF .&1 = . &GCTC -CENT
&IF .&1 = .END &GCTC -FIN
&IF .&1 = .LIST &GCTC -LIST
&IF .&1 = .7 &GCTC -END7
&IF .&1 = .6 &GCTC -END6
&IF .&1 = .5 &GCTC -END5
&IF .&1 = .4 &GCTC -END4
&IF .&1 = .3 &GCTC -END3
&IF .&1 = .2 &GCTC -END2
&IF .&1 = .1 &GCTC -END1
-CENT
&BEGTYPE

```

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

```

&ENDTYPE
&READ ARGS
&GCTC -INIT
-END1
EX VERTRUN
&GCTC -PASS
-END2
EX VERTBAT
&GCTC -PASS
-END3
EX VERTTEST
&GCTC -PASS
-END4
EX VERTIN
&GCTC -PASS
-END5

```

FILE: VERTEX EXEC A1 MIDWEST S+E COMPUTER CENTER

EX VERTEDIT  
EGCTC -PASS  
-END6  
EX VERTFLT  
EGCTC -PASS  
-END7  
EX VERTGRAF  
EGCTC -PASS  
-LIST  
EX VERTINDX  
EGCTC -PASS  
-PASS  
EARGS  
EGCTC -INIT  
-FIN

FILE: VERTRUN EXEC A1 MIDWEST S+E COMPUTER CENTER

```
&CCNTROL OFF
&TYPE
&TYPE DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ? ENTER YES/NO
&READ ARGS
&IF &1 = YES &GOTO -RUN2
ERASE * AAAAA A
&TYPE ENTER VERT INPUT FILE NAME
&READ ARGS
&CONTROL ALL
FI 05 DISK &1 DATA A1
FI 06 DISK VOUTPUT AAAAA A
FI 07 DISK VERTPLN AAAAA A
FI 08 DISK VERT1 AAAAA A (LRECL 88 BLKSIZE 884 RECFM VBS)
FI 09 DISK VERT2 AAAAA A (LRECL 88 BLKSIZE 884 RECFM VBS)
FI 10 DISK VERT3 AAAAA A (LRECL 96 BLKSIZE 964 RECFM VBS)
FI 11 DISK VERT4 AAAAA A (LRECL 444 BLKSIZE 444 RECFM VBS)
VERTNEW
&CCNTROL OFF
&GOTO -CONT
-RUN2
ERASE * AAAAA A
&TYPE ENTER VERT INPUT FILE NAME
&READ ARGS
&CCNTROL ALL
GLCEAL TXTLIB FORTMOD2 MOD2EEF TTXTCS TTXAGII SANDESUB TELELIB CMSLIB
FI 01 DISK VBANKNAM DATA A1 (RECFM FB LRECL 80
VBANKNAM
FI 01 DISK VBANKNAM DATA A1 (RECFM FB LRECL 80
FI 05 DISK &1 DATA A1
FI 06 DISK VOUTPUT AAAAA A1
FI 07 DISK VERTPLN AAAAA A1
FI 08 DISK VERT1 AAAAA A1 (LRECL 88 BLKSIZE 884 RECFM VBS)
FI 09 DISK VERT2 AAAAA A1 (LRECL 88 BLKSIZE 884 RECFM VBS)
FI 10 DISK VERT3 AAAAA A1 (LRECL 96 BLKSIZE 964 RECFM VBS)
FI 11 DISK VERT4 AAAAA A1 (LRECL 444 BLKSIZE 444 RECFM VBS)
VERTNEW1
-CONT
&CONTROL OFF
CCPY PRM DATA A1 PROLINE DATA A1 (REPLACE
CP MSG * YOUR JOB HAS FINISHED
&READ ARGS
```



FILE: VERTBAT EXEC A1 MIDWEST S+E COMPUTER CENTER

&CONTROL OFF  
CP QUERY BATCHDV  
&TYPE  
&TYPE IS BATCHDV "DSC" ? ENTER YES/NO  
&READ ARGS  
&IF &1 EQ NO &GOTO -OFF  
&BEGETYPE

DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ? ENTER YES/NO

&END  
&READ ARGS  
&IF &1 = YES &GOTO -RUN2  
FI 04 DISK VERTBAT DATA A1 (RECFM FB LRECL 80 BLKSIZE 6400)  
FI 05 TERM  
FI 06 TERM

VERTBAT  
&BEGSTACK  
VERIFY OFF  
DOWN 8

GET VERTBAT DATA A1 1 2  
DOWN 6

GET VERTBAT DATA A1 3 1

FILE

&END

EDIT VERTNEW BATCH

BATCH SUBMIT VERTNEW BATCH

&BEGSTACK

VERIFY OFF

DOWN 9

DELETE 2

DOWN 6

DELETE

FILE

&END

EDIT VERTNEW BATCH A1

&GOTO -END

-RUN2

GLOBAL TXLIB FORTMOD2 MOD2EEH TTXTC5 TTXAGII SANDESUB TELELIB CMSLIB

FI 01 DISK VEANKM1 DATA A1 (RECFM FB LRECL 80)

VEANKM1

FI 04 DISK VERTBAT DATA A1 (RECFM FB LRECL 80 BLKSIZE 6400)

FI 05 TERM

FI 06 TERM

VERTBAT1

&BEGSTACK

VERIFY OFF

DOWN 8

GET VERTBAT DATA A1 1 1

DOWN

GET VERTBAT DATA A1 2 3

DOWN 6

GET VERTBAT DATA A1 5 2

FILE

&END



FILE: VERTBAT EXEC A1 MIDWEST S+E COMPUTER CENTER

```
EDIT VERTNEW1 BATCH A1
BATCH SUBMIT VERTNEW1 BATCH
&BEGSTACK
VERIFY OFF
DOWN 9
DELETE
DOWN
DELETE 3
DOWN 6
DELETE 2
FILE
&END
EDIT VERTNEW1 BATCH A1
&GCTC -END
-OFF
&TYPE
&TYPE YOU CAN'T RUN VERT OFFLINE AT THIS TIME BECAUSE BATCHDV IS NOT LOGGED ON
CF MSG OP PLEASE LOG BATCHDV ON
&TYPE
&TYPE I HAVE SENT A MESSAGE TO THE OPERATOR TO LOG BATCHDV ON
&TYPE
&TYPE WAIT UNTIL THE OPERATOR TELLS YOU THAT BATCHDV IS LOGGED ON
&TYPE BEFORE YOU USE MENU ITEM AC.2 AGAIN
&TYPE
-END
&TYPE
&READ ARGS
```

|  |          |
|--|----------|
| INTEGER*2 NAME(3)  | VER00010 |
| WRITE(6,1)   | VER00020 |
| 1 FORMAT(/, ' ENTER THE UNIQUE FILENAME OF THE VERT FILE TO BE RUN | VER00030 |
| 1 ' ' (SIX CHARACTERS MAX) ')                                      | VER00040 |
| READ(5,2) NAME   | VER00050 |
| 2 FORMAT(3A2)  | VER00060 |
| WRITE(4,3) NAME  | VER00070 |
| 3 FORMAT('FI 05 DISK VI',3A2,' DATA B1')                           | VER00080 |
| WRITE(4,4) NAME  | VER00090 |
| 4 FORMAT('FI 06 DISK VO',3A2,' DATA W1 (LRECL 132)')               | VER00100 |
| WRITE(4,5) NAME  | VER00110 |
| 5 FORMAT('CP MSG FPKERLY VI',3A2,' HAS FINISHED')                  | VER00120 |
| STOP   | VER00130 |
| END  | VER00140 |

FILE: VERTNEW BATCH A1 MIDWEST S+E COMPUTER CENTER

```
/JOB FPKERLY FPVERT
/IDENT VERTNEW
CP SPOOL CONSOLE FPKERLY START TERM CLASS C
CF LINK FPKERLY 191 192 RR KEN
ACCESS 192 B/A
CF LINK FPKERLY 194 194 MW KLK
ACCESS 194 W
ERASE * AAAA W
FI 07 DISK VERTPUN AAAA W1
FI 08 DISK VERT1 AAAA W1 (LRECL 88 BLKSIZE 444 RECFM VBS)
FI 09 DISK VERT2 AAAA W1 (LRECL 88 BLKSIZE 444 RECFM VBS)
FI 10 DISK VERT3 AAAA W1 (LRECL 96 BLKSIZE 964 RECFM VBS)
FI 11 DISK VERT4 AAAA W1 (LRECL 444 BLKSIZE 4444 RECFM VBS)
VERTNEW
CF SFCCL CONSOLE STCP NCCONT
CF SFCCL CONSOLE CLOSE
CF SFCCL E NCCONT
CP CLOSE 00E
CP SPOOL E OFF
CF SPOOL D NOCONT
CF CLOSE D
CF SFCCL D OFF
/*
```

|   |          |
|---|----------|
| INTEGER*2 NAME(3)   | VER00010 |
| WRITE(6,1)  | VER00020 |
| 1 FORMAT(//, ' ENTER THE UNIQUE FILENAME OF THE VERT FILE TO BE RUN | VER00030 |
| 1 ' (SIX CHARACTERS MAX)')  | VER00040 |
| READ(5,2) NAME  | VER00050 |
| 2 FORMAT(3A2)   | VER00060 |
| WRITE(4,3) NAME   | VER00070 |
| 3 FORMAT('COPY VBANKNM1 DATA B1 VB',3A2,' DATA W1 (REPLACE')        | VER00080 |
| WRITE(4,4) NAME   | VER00090 |
| 4 FORMAT('FI 01 DISK VB',3A2,' DATA W1')                            | VER00100 |
| WRITE(4,5) NAME   | VER00110 |
| 5 FORMAT('FI 05 DISK VI',3A2,' DATA B1')                            | VER00120 |
| WRITE(4,6) NAME   | VER00130 |
| 6 FORMAT('FI 06 DISK VC',3A2,' DATA W1 (LRECL 132)')                | VER00140 |
| WRITE(4,7) NAME   | VER00150 |
| 7 FORMAT('COPY PRM DATA A1 PR',3A2,' DATA W1 (REPLACE')             | VER00160 |
| WRITE(4,8) NAME   | VER00170 |
| 8 FORMAT('CP MSG FPKERLY VI',3A2,' HAS FINISHED')                   | VER00180 |
| STOP  | VER00190 |
| END   | VER00200 |

```
/JOB FPKERLY FPVERT
/IDENT VERTNEW1
CP SFCOL CONSOLE FPKERLY START TERM CLASS C
CP LINK FPKERLY 191 192 RR KEN
ACCESS 192 B/A
CP LINK FPKERLY 194 194 MW KLK
ACCESS 194 W
ERASE * AAAA W
GLCEAL TXTLIB VFORTLIB TELELIB TTXTCS TTXAGII SANDESUB CMSLIB
FI 07 DISK VERTPLN AAAA W1
FI 08 DISK VERT1 AAAA W1 (LRECL 88 BLKSIZE 444 RECFM VBS)
FI 09 DISK VERT2 AAAA W1 (LRECL 88 BLKSIZE 444 RECFM VBS)
FI 10 DISK VERT3 AAAA W1 (LRECL 96 BLKSIZE 564 RECFM VBS)
FI 11 DISK VERT4 AAAA W1 (LRECL 444 BLKSIZE 4444 RECFM VBS)
VERTNEW1
CP SPOOL CONSOLE STOP NOCONT
CP SPOOL CONSOLE CLOSE
CP SPCCL E NOCONT
CP CLCSE 00E
CP SPCCL E OFF
CP SFCOL C NOCCNT
CP CLOSE D
CP SPOOL D OFF
/*
```

```
&CONTROL OFF
&FTIME = 1
&TYPE DID YOU RUN VERT ONLINE ?
&TYPE ENTER YES/NO
&READ ARGS
&ON = &1
&EMODE = NO
&IF &1 = NO &GOTO -BATCH
-ONLINE
&BEGSTACK
BCTTCM
SAVE
&END
EDIT VOUTPUT AAAA A1
&GCTC -CONT
-CCNT
&TYPE ENTER YES/NO FOR ROUTING
&READ ARGS
&IF &ON = NO &GOTO -CONT1
&IF &1 = NO &GOTO -EN
&GCTC -CONT3
-CCNT1
&IF &EMODE = YES &GCTC -CCNT2
&IF &1 = NO &GOTO -ER
&GOTO -CONT3
-CCNT2
&IF &1 = NO &GOTO -EN
-CCNT3
&TYPE ENTER THE NUMBER OF COPIES YOU WANT
&READ ARGS
ROUTEPR DEST REMOTE4 COPIES &1
&IF &CN = YES &GCTC -PRON
&IF &EMODE = NO &GOTO -WMODE
PRINT &FNAME DATA E1 (CC
&GOTO -EN
-WMODE
PRINT &FNAME DATA W1 (CC
&GCTC -ER
-FRICA
PRINT VOUTPUT AAAA A1 (CC
&GOTO -EN
-END1
&FTIME = 2
&TYPE DO YOU WANT TO FIND OUT IF ANY OF YOUR VERT OFFLINE
&TYPE JOB(S) HAVE FINISHED ? ENTER YES/NO
&READ ARGS
&IF &1 = NO &GOTO -MSG
BATCH QUERY USER FPKERLY *
&GCTC -CONT4
-MSG
&TYPE YOU CAN'T ACCESS AN OUTPUT FILE UNTIL ALL FILES HAVE BEEN CREATED FROM CMS BAT
&TYPE
&TYPE HOWEVER YOU MAY PRINT OUT A FILE THAT HAS ALREADY BEEN CREATED
&TYPE
&TYPE ENTER YES/NO IF YOU WANT A FILE PRINTED
```

FILE: VERTTEST EXEC      A1    MIDWEST S+E COMPUTER CENTER

&TYPE  
&READ ARGS  
&EMODE = &1  
&IF &1 = NO &GOTO -EN  
&TYPE ENTER THE VERT OUTPUT FILE YOU WANT TO PRINT  
&TYPE  
&TYPE ENTER FILENAME ONLY  
&TYPE  
&READ ARGS  
ACCESS 194 E/A  
&FNAME = &1  
&GOTO -CONT  
-BATCH  
&BEGTYPE

HAVE YOU RECEIVED NOTICE THAT YOUR LAST CMS BATCH JOB SUBMITTED  
HAS COMPLETED ?      ENTER YES/NO

&END  
&READ ARGS  
&IF &1 = YES &GOTO -END2  
&IF &FTIME EQ 1 &GOTO -END1  
-CONT4  
&TYPE  
&TYPE  
&TYPE HAS ALL OF YOUR OFFLINE JOBS FINISHED ?  
&TYPE  
&TYPE      ENTER YES/NO  
&READ ARGS  
&IF &1 = NO &GOTO -MSG  
-END2  
ACCESS 194 W  
&TYPE ENTER THE VERT OUTPUT FILE YOU WANT TO ACCESS  
&TYPE  
&TYPE ENTER FILENAME ONLY  
&TYPE  
&READ ARGS  
&BEGSTACK  
TOP  
SAVE  
&END  
EDIT &1 DATA W1  
&FNAME = &1  
&GOTO -CONT  
-ER  
&FTIME = 1  
-NEXT  
&IF &FTIME EQ 2 &GOTO -CONT5  
&TYPE  
&TYPE DO YOU WANT TO ERASE ANY OUTPUT FILES ?  
&GOTO -CONT6  
-CONT5  
&TYPE DO YOU WANT TO ERASE ANY MORE OUTPUT FILES ?  
-CONT6  
&TYPE



&TYPE ENTER YES/NO

&READ ARGS

&IF &1 = NO &GOTO -EN

&IF &EMODE = YES &GOTO -EN

&F1TIME = 2

&TYPE

&TYPE ENTER THE VERT OUTPUT FILE YOU WANT TO ERASE

&TYPE

&TYPE ENTER FILENAME ONLY

&READ ARGS

ERASE &1 DATA W1

&GOTO -NEXT

-EN

RELEASE 194

ACCESS 194 E/A

FILE: VERTIN EXEC A1 MIDWEST S+E COMPUTER CENTER

&CNTRCL CFF  
&BEGTYPE

NOTE: IN ORDER TO BE ABLE TO RUN VERT OFFLINE, THE FIRST TWO LETTERS OF THE VERT INPUT FILENAME MUST BEGIN WITH VI. THE REMAINING SIX MAX ALPHANUMERIC CHARACTERS MAY BE ANYTHING YOU WISH.

DO YOU WISH TO USE FREE FORM OR FIXED FORM FORMAT FOR CREATING YOUR VERT INPUT FILE ? ENTER THE OPTION NUMBER LISTED BELOW:

1 -> FREE FORM (FIELDS ARE SEPARATED BY COMMAS. THUS ARC OR NODE NAMES MUST NOT CONTAIN COMMAS IN THE NAME. WHEN A FIELD IS NOT USED IT'S ABSENCE MUST BE INDICATED BY A COMMA IF IT IS FOLLOWED BY ANOTHER FIELD. THE PROGRAM WILL PROMPT THE USER FOR DATA)

2 -> FIXED FORM (USE THE TABSET COMMAND TO AID INPUT)

&END  
&READ ARGS  
&IF .&1 = .2 &GCTC -FIXED  
EX VERTFREE  
&GLTL -END  
-FIXED  
EX VERTINF  
-END

FILE: VERTFREE EXEC

A1 MIDWEST S+E COMPUTER CENTER

&CONTROL OFF

&TYPE

&TYPE ENTER VERT INPUT FILE NAME

&READ ARGS

FI 3 DISK &1 DATA A1 (RECFM FB LRECL 80  
VERTFREE

FILE: VERTINP EXEC A1 MIDWEST S+E COMPUTER CENTER

&CONTROL CFF

&TYPE ENTER NEW VERT INPUT FILENAME

&READ ARGS

EDIT &1 DATA A1

|   |          |
|---|----------|
| COMMON LINE1(81), LINEC(80), IRRCR, IFIELD, ITUB, IBLK                                | VER00010 |
| ODIMENSION LSEP(81), IABC(21), ICCN(23), IARC(5), IFUN(16),                           | VER00020 |
| IJFUN(16), NCDE(9)  | VER00030 |
| DATA IZERC, ICCMMA, IPLUS, MINUS/ IFO, IF+, IF-, IF- /                                | VER00040 |
| DATA IABC/ IFA, IFB, IFC, IFD, IFE, IFF, IFH, IFI, IFK, IFL, IFM, IFN, IFH, IFP,      | VER00050 |
| IIRK, IHS, IHT, IHC, IF1, IF2, IF3/   | VER00060 |
| DATA ICCN/ 1, 2, 3, 4, 5, 6, 7, 8, 9, 19, 24, 28, 32, 35, 38, 41, 44, 47, 50, 53, 62, | VER00070 |
| 171, 80/  | VER00080 |
| DATA IARC/ 15, 24, 28, 29, 80/  | VER00090 |
| DATA IFUN/ 17, 18, 19, 27, 28, 36, 37, 45, 47, 48, 49, 57, 58, 66, 67, 75/            | VER00100 |
| DATA IJFUN/ IF, IFH, IFH, IFA, IFH, IFA, IFH, IFA, IFH, IFH, IFH, IFA, IFH,           | VER00110 |
| IIRK, IFH, IFA/   | VER00120 |
| DATA NCDE/ 9, 12, 14, 16, 20, 24, 28, 29, 80/   | VER00130 |
| C THIS PROGRAM RECEIVES INPUT VIA AN INTERACTIVE TERMINAL AND TRANS-                  | VER00140 |
| C FORMS IT TO THE STANDARD VERT INPUT LAYOUT. I/O ASSIGNMENTS                         | VER00150 |
| C ITUB = CRT, ICUT = NEW FILE READY FOR VERT  | VER00160 |
| C   | VER00170 |
| ITUB = 5  | VER00180 |
| ICUT = 3  | VER00190 |
| IBLK = IJFUN(1)   | VER00200 |
| LNUMB = 0   | VER00210 |
| KEY = 0   | VER00220 |
| ITITLE = 0  | VER00230 |
| C   | VER00240 |
| C IF A NEW TYPE OF DATA CARD IS BEING LOADED, PRINT A TITLE                           | VER00250 |
| C   | VER00260 |
| 1111 KEY = KEY + 1  | VER00270 |
| 1122 IF (ITITLE.EQ.1) GO TO 1300  | VER00280 |
| GO TO (1133, 1155, 1177, 1199, 1211, 1233, 1255, 1277, 1888), KEY                     | VER00290 |
| 1133 WRITE (ITUB, 1144)   | VER00300 |
| 1144 FORMAT (/22F ENTER THE CONTROL CARD)   | VER00310 |
| GO TO 1300  | VER00320 |
| 1155 IF (IPT1.EQ.IBLK) GO TO 1111   | VER00330 |
| IF (IPT1.EQ.IZERC) GO TO 1111   | VER00340 |
| WRITE (ITUB, 1166)  | VER00350 |
| 1166 FORMAT (/38F ENTER THE PROBLEM IDENTIFICATION CARD)                              | VER00360 |
| GO TO 1300  | VER00370 |
| 1177 IF (IPT2.EQ.IBLK) GO TO 1111   | VER00380 |
| IF (IPT2.EQ.IZERC) GO TO 1111   | VER00390 |
| WRITE (ITUB, 1188)  | VER00400 |
| 1188 FORMAT (/38F ENTER THE FULL PRINT TRIP OPTION CARD)                              | VER00410 |
| GO TO 1300  | VER00420 |
| 1199 IF (IPT3.EQ.IBLK) GO TO 1111   | VER00430 |
| IF (IPT3.EQ.IZERC) GO TO 1111   | VER00440 |
| WRITE (ITUB, 1200)  | VER00450 |
| 1200 FORMAT (/55F ENTER THE CORRELATION COMPUTATION AND PLOT OPTION CARD              | VER00460 |
| 1)  | VER00470 |
| GO TO 1300  | VER00480 |
| 1211 IF (IPT4.EQ.IBLK) GO TO 1111   | VER00490 |
| IF (IPT4.EQ.IZERC) GO TO 1111   | VER00500 |
| WRITE (ITUB, 1222)  | VER00510 |
| 1222 FORMAT (/77F ENTER THE COST-PERFORMANCE TIME INTERVAL OPTION CARDS,              | VER00520 |
| 1 FINISH WITH "ENDCTPR")  | VER00530 |
| GO TO 1299  | VER00540 |
|   | VER00550 |

FILE: VERTFREE FORTRAN A1 MIDWEST S+E COMPUTER CENTER

```
1233 IF(IPT5.EQ.IBLK) GO TO 1111
      IF(IPT5.EQ.IZERO) GO TO 1111
      WRITE (ITUB,1244)
1244 FORMAT(/49H ENTER THE COMPOSITE TERMINAL NODE HISTOGRAM CARD)
      GO TO 1300
1255 WRITE (ITUE,1266)
1266 FORMAT(/63H ENTER THE MASTER AND SATELLITE ARC CARDS, FINISH WITH
      1 "ENDARC")
      GO TO 1299
1277 WRITE (ITUE,1238)
1288 FORMAT(/65H ENTER THE MASTER AND SATELLITE NODE CARDS, FINISH WITH
      1 "ENDNODE")
C
C      READ ANOTHER LINE OF DATA
C
1299 ITITLE = 1
1300 LNUMB = LNUMB + 1
1311 WRITE (ITUE,1322) LNUMB
1322 FORMAT(/37H THE NEXT LINE OF DATA IS LINE NUMBER, I4)
      READ (ITUE,1333) (LINEI(I), I=1,80)
1333 FORMAT (80A1)
C
C      FIND THE LAST NON BLANK CHARACTER, IF NO NON BLANK CHARACTERS,
C      RESUBMIT, OTHERWISE ENTER A COMMA IF THE LAST NON BLANK
C      CHARACTER WAS NOT A COMMA
C
      IFIELD = 0
      IRROR = 0
      N = 0
      DO 1344 I=1,80
      IF(LINEI(I).NE.IBLK) N = I
1344 LINEC(I) = IBLK
      IF(N.GT.0) GO TO 1360
      WRITE (ITUB,1355)
1355 FORMAT(/31H ***ERROR*** NO DATA - RESUBMIT)
      GO TO 1311
1366 IF(LINEI(N).EQ.ICOMMA) GO TO 1377
      N = N + 1
      LINEI(N) = ICOMMA
C
C      FIND THE LOCATION OF THE SEPARATORS - THE COMMAS
C
1377 NSEP = 0
      DO 1398 I=1,N
      IF(LINEI(I).NE.ICOMMA) GO TO 1388
      NSEP = NSEP + 1
      LSEP(NSEP) = I
1388 CONTINUE
C
C      LOAD EACH CARD TYPE
C
      M = 0
      J = 1
      GO TO (1411,1444,1455,1477,1499,1511,1544,1555),KEY
1399 WRITE (ITUE,1400)
```

VER00560  
VER00570  
VER00580  
VER00590  
VER00600  
VER00610  
VER00620  
VER00630  
VER00640  
VER00650  
VER00660  
VER00670  
VER00680  
VER00690  
VER00700  
VER00710  
VER00720  
VER00730  
VER00740  
VER00750  
VER00760  
VER00770  
VER00780  
VER00790  
VER00800  
VER00810  
VER00820  
VER00830  
VER00840  
VER00850  
VER00860  
VER00870  
VER00880  
VER00890  
VER00900  
VER00910  
VER00920  
VER00930  
VER00940  
VER00950  
VER00960  
VER00970  
VER00980  
VER00990  
VER01000  
VER01010  
VER01020  
VER01030  
VER01040  
VER01050  
VER01060  
VER01070  
VER01080  
VER01090  
VER01100



1400 FORMAT(/46H \*\*\*ERROR\*\*\* TOO MANY FIELD ENTRIES - RESUBMIT)  
GO TO 1311

C  
C LOAD THE CONTROL CARD AND THE SWITCHES

C  
1411 IF(NSEP.GT.25) GO TO 1399  
DO 1422 I=1,NSEP  
N = LSEP(I)  
K = ICCN(I)  
CALL TRANS (M,N,J,K,0,0)  
M = N

1422 J = K + 1  
IPT1 = LINEC(1)  
IPT2 = LINEC(5)  
IPT3 = LINEC(6)  
IPT4 = LINEC(7)  
IPT5 = LINEC(8)

1433 KEY = KEY + 1  
GO TO 1877

C  
C LOAD THE PROBLEM IDENTIFICATION CARD

C  
1444 L = LSEP(NSEP)  
CALL TRANS (0,L,1,00,1,1)  
GO TO 1433

C  
C LOAD THE FULL PRINT TRIP OPTION CARD

C  
1455 IF(NSEP.GT.10) GO TO 1399  
DO 1466 I=1,NSEP  
N = LSEP(I)  
K = J + 7  
CALL TRANS (M,N,J,K,1,0)  
M = N

1466 J = J + 8  
GO TO 1433

C  
C LOAD THE CORRELATION COMPUTATION AND PLOT OPTION CARD

C  
1477 IF(NSEP.GT.12) GO TO 1399  
DO 1488 I=1,NSEP  
N = LSEP(I)  
K = J + 1  
CALL TRANS (M,N,J,K,0,0)  
M = N

1488 J = J + 2  
GO TO 1433

C  
C LOAD THE CCST-PERFORMANCE TIME INTERVAL OPTION CARDS, FIRST, CHECK FOR  
C THE "ENDCTPR" CARD, THE LAST CARD OF THIS SERIES

C  
1499 IF(NSEP.GT.6) GO TO 1399  
IF(LINEI(1).NE.IABC(5)) GO TO 1522  
IF(LINEI(2).NE.IABC(12)) GO TO 1522  
IF(LINEI(3).NE.IAEC(4)) GO TO 1522

VER01110  
VER01120  
VER01130  
VER01140  
VER01150  
VER01160  
VER01170  
VER01180  
VER01190  
VER01200  
VER01210  
VER01220  
VER01230  
VER01240  
VER01250  
VER01260  
VER01270  
VER01280  
VER01290  
VER01300  
VER01310  
VER01320  
VER01330  
VER01340  
VER01350  
VER01360  
VER01370  
VER01380  
VER01390  
VER01400  
VER01410  
VER01420  
VER01430  
VER01440  
VER01450  
VER01460  
VER01470  
VER01480  
VER01490  
VER01500  
VER01510  
VER01520  
VER01530  
VER01540  
VER01550  
VER01560  
VER01570  
VER01580  
VER01590  
VER01600  
VER01610  
VER01620  
VER01630  
VER01640  
VER01650

|   |          |
|---|----------|
| IF(LINEI(4).NE.IABC(3)) GO TO 1522                                  | VER01660 |
| IF(LINEI(5).NE.IABC(17))GO TO 1522                                  | VER01670 |
| IF(LINEI(6).NE.IABC(14))GO TO 1522                                  | VER01680 |
| IF(LINEI(7).NE.IABC(15))GO TO 1522                                  | VER01690 |
| 1500 ITITLE = 0   | VER01700 |
| GO TO 1444  | VER01710 |
| C   | VER01720 |
| C LOCAL THE CCST-PERFORMANCE TIME INTERVAL OPTION CARDS OR MINIMUMS | VER01730 |
| C AND MAXIMUMS FOR THE COMPOSITE TERMINAL HISTOGRAMS                | VER01740 |
| C   | VER01750 |
| 1511 IF(NSEP.GT.8) GO TO 1399                                       | VER01760 |
| 1522 DO 1533 I=1,NSEP   | VER01770 |
| N = LSEP(I)   | VER01780 |
| K = J + 9   | VER01790 |
| CALL TRANS (M,N,J,K,0,0)  | VER01800 |
| M = N   | VER01810 |
| 1533 J = J + 10   | VER01820 |
| IF(KEY - 6)1877,1433,1877   | VER01830 |
| C   | VER01840 |
| C CHECK FOR ENLARC CARD   | VER01850 |
| C   | VER01860 |
| 1544 IF(LINEI(1).NE.IAEC(5)) GO TO 1566                             | VER01870 |
| IF(LINEI(2).NE.IABC(12))GO TO 1566                                  | VER01880 |
| IF(LINEI(3).NE.IABC(4)) GO TO 1566                                  | VER01890 |
| IF(LINEI(4).NE.IABC(1)) GO TO 1566                                  | VER01900 |
| IF(LINEI(5).NE.IABC(15))GO TO 1566                                  | VER01910 |
| IF(LINEI(6).NE.IAEC(3)) GO TO 1566                                  | VER01920 |
| GO TO 1550  | VER01930 |
| C   | VER01940 |
| C CHECK FOR ENDNCDE CARD  | VER01950 |
| C   | VER01960 |
| 1555 IF(LINEI(1).NE.IABC(5)) GO TO 1566                             | VER01970 |
| IF(LINEI(2).NE.IABC(12))GO TO 1566                                  | VER01980 |
| IF(LINEI(3).NE.IABC(4)) GO TO 1566                                  | VER01990 |
| IF(LINEI(4).NE.IABC(12))GO TO 1566                                  | VER02000 |
| IF(LINEI(5).NE.IABC(13))GO TO 1566                                  | VER02010 |
| IF(LINEI(6).NE.IABC(4)) GO TO 1566                                  | VER02020 |
| IF(LINEI(7).NE.IABC(5)) GO TO 1566                                  | VER02030 |
| GO TO 1570  | VER02040 |
| C   | VER02050 |
| C LOAD THE ARC OR NCDE NAME AND CHECK FOR MIN NO. OF COMMAS         | VER02060 |
| C   | VER02070 |
| 1566 M = LSEP(1)  | VER02080 |
| CALL TRANS (0,M,1,8,1,0)  | VER02090 |
| IF(NSEP.GE.3) GO TO 1588  | VER02100 |
| WRITE (1TUB,1577)   | VER02110 |
| 1577 FORMAT(/41F ***ERRCR*** NCT ENOUGH COMMAS - RESUBMIT)          | VER02120 |
| GO TO 1311  | VER02130 |
| 1588 J = 9  | VER02140 |
| N = LSEP(2)   | VER02150 |
| I = N - M   | VER02160 |
| IF(KEY.EQ.8) GO TO 1799   | VER02170 |
| C   | VER02180 |
| C IF THIS CARD LOOKS LIKE A SATELLITE ARC CARD, TEST IT             | VER02190 |
| C   | VER02200 |

|  |           |
|--|-----------|
| IF(I.NE.6) GO TO 1655                      | VER02210  |
| IPT1 = M + 1                               | VER02220  |
| IPT2 = M + 2                               | VER02230  |
| IPT3 = M + 3                               | VER02240  |
| IPT4 = M + 4                               | VER02250  |
| IPT5 = M + 5                               | VER02260  |
| C  | VER02270  |
| C  | VER02280  |
| C  | VER02290  |
| IF(LINEI(IPT2).NE.IABC(17))GO TO 1599      | VER02300  |
| IF(LINEI(IPT3).NE.IABC(8)) GO TO 1599      | VER02310  |
| IF(LINEI(IPT4).NE.IABC(11))GO TO 1599      | VER02320* |
| IF(LINEI(IPT5).EQ.IABC(5)) GO TO 1622      | VER02330  |
| C  | VER02340  |
| C  | VER02350  |
| C  | VER02360  |
| 1599 IF(LINEI(IPT2).NE.IABC(3)) GO TO 1600 | VER02370  |
| IF(LINEI(IPT3).NE.IABC(13))GO TO 1600      | VER02380  |
| IF(LINEI(IPT4).NE.IABC(16))GO TO 1600      | VER02390  |
| IF(LINEI(IPT5).EQ.IABC(17))GO TO 1622      | VER02400  |
| IF(LINEI(IPT5).EQ.IAEC(8)) GO TO 1622      | VER02410  |
| IF(LINEI(IPT5).EQ.IABC(4)) GO TO 1622      | VER02420  |
| IF(LINEI(IPT5).EQ.IABC(2)) GO TO 1622      | VER02430  |
| C  | VER02440  |
| C  | VER02450  |
| C  | VER02460  |
| 1600 IF(LINEI(IPT2).NE.IABC(14))GO TO 1611 | VER02470  |
| IF(LINEI(IPT3).NE.IABC(5)) GO TO 1611      | VER02480  |
| IF(LINEI(IPT4).NE.IABC(15))GO TO 1611      | VER02490  |
| IF(LINEI(IPT5).EQ.IABC(6)) GO TO 1622      | VER02500  |
| IF(LINEI(IPT5).EQ.IABC(8)) GO TO 1622      | VER02510  |
| IF(LINEI(IPT5).EQ.IABC(4)) GO TO 1622      | VER02520  |
| IF(LINEI(IPT5).EQ.IABC(2)) GO TO 1622      | VER02530  |
| C  | VER02540  |
| C  | VER02550  |
| C  | VER02560  |
| 1611 IF(LINEI(IPT2).NE.IBLK) GO TO 1623    | VER02570  |
| IF(LINEI(IPT3).NE.IBLK) GO TO 1623         | VER02580  |
| IF(LINEI(IPT4).NE.IBLK) GO TO 1623         | VER02590  |
| IF(LINEI(IPT5).NE.IBLK) GO TO 1623         | VER02600  |
| C  | VER02610  |
| C  | VER02620  |
| C  | VER02630  |
| 1622 IF(LINEI(IPT1).EQ.IAEC(4)) GO TO 1677 | VER02640  |
| IF(LINEI(IPT1).EQ.IABC(7)) GO TO 1677      | VER02650  |
| IF(LINEI(IPT1).EQ.IABC(15))GO TO 1699      | VER02660  |
| IF(LINEI(IPT1).EQ.IABC(11))GO TO 1677      | VER02670  |
| C  | VER02680  |
| C  | VER02690  |
| C  | VER02700  |
| 1633 IF(LINEI(IPT1).NE.IABC(6)) GO TO 1644 | VER02710  |
| IF(LINEI(IPT2).NE.IABC(8)) GO TO 1644      | VER02720  |
| IF(LINEI(IPT3).NE.IABC(10))GO TO 1644      | VER02730  |
| IF(LINEI(IPT4).NE.IABC(17))GO TO 1644      | VER02740  |
| C  | VER02750  |

|      |   |          |
|------|---|----------|
| C    | DETERMINE WHICH FILTER  | VER02760 |
| C    |   | VER02770 |
|      | IF(LINEI(IPT5).EQ.IABC(19))GO TO 1677                           | VER02780 |
|      | IF(LINEI(IPT5).EQ.IABC(20))GO TO 1677                           | VER02790 |
|      | IF(LINEI(IPT5).EQ.IABC(21))GO TO 1628                           | VER02800 |
| C    |   | VER02810 |
| C    | CHECK FOR SLACK SATELLITE                                       | VER02820 |
| C    |   | VER02830 |
| 1644 | IF(LINEI(IPT1).NE.IABC(16))GO TO 1655                           | VER02840 |
|      | IF(LINEI(IPT2).NE.IABC(10))GO TO 1655                           | VER02850 |
|      | IF(LINEI(IPT3).NE.IABC(1))GO TO 1655                            | VER02860 |
|      | IF(LINEI(IPT4).NE.IABC(9))GO TO 1655                            | VER02870 |
|      | IF(LINEI(IPT5).EQ.IBLK)GO TO 1677                               | VER02880 |
| C    |   | VER02890 |
| C    | NO SATELLITES, RATHER, ANOTHER ARC CARD, LOAD IT                | VER02900 |
| C    |   | VER02910 |
| 1655 | MAX = NSEP  | VER02920 |
|      | IF(NSEP.GT.6)GO TO 1399   | VER02930 |
|      | DC 1656 I=2,MAX   | VER02940 |
|      | N = LSEP(I)   | VER02950 |
|      | K = IABC(I-1)   | VER02960 |
|      | L = 1   | VER02970 |
|      | IF(K.EQ.28) L = C   | VER02980 |
|      | LL = 0  | VER02990 |
|      | IF(K.GT.29) LL = 1  | VER03000 |
|      | CALL TRANS (M,N,J,K,L,LL)                                       | VER03010 |
|      | M = N   | VER03020 |
| 1666 | J = K + 1   | VER03030 |
|      | GO TO 1877  | VER03040 |
| C    |   | VER03050 |
| C    | LOAD THE FORMAT KEY INDICATOR                                   | VER03060 |
| C    |   | VER03070 |
| 1677 | K = 1   | VER03080 |
|      | GO TO 1700  | VER03090 |
| 1688 | K = 2   | VER03100 |
|      | GO TO 1700  | VER03110 |
| 1699 | K = 3   | VER03120 |
| C    |   | VER03130 |
| C    | LOAD THE SATELLITE IDENTIFIER AND THE CARD SEQUENCE NUMBER      | VER03140 |
| C    |   | VER03150 |
| 1700 | CALL TRANS (M,N,9,13,1,0)                                       | VER03160 |
|      | M = N   | VER03170 |
|      | N = LSEP(3)   | VER03180 |
|      | CALL TRANS (M,N,14,15,0,0)                                      | VER03190 |
|      | M = N   | VER03200 |
|      | J = 16  | VER03210 |
|      | IF(K - 2)1711,1733,1755   | VER03220 |
| C    |   | VER03230 |
| C    | LOAD DISTRIBUTION, HISTOGRAM, MONTE CARLO, SLACK AND FILTER 1-2 | VER03240 |
| C    |   | VER03250 |
| 1711 | IF(NSEP.GT.9)GO TO 1399   | VER03260 |
|      | DC 1722 I=4,NSEP  | VER03270 |
|      | N = LSEP(I)   | VER03280 |
|      | K = J + 9   | VER03290 |
|      | CALL TRANS (M,N,J,K,0,0)  | VER03300 |

|      |  |          |
|------|--|----------|
|      | M = N  | VER03310 |
| 1722 | J = J + 10   | VER03320 |
|      | GO TO 1877   | VER03330 |
| C    |  | VER03340 |
| C    | LOAD FILTER 3  | VER03350 |
| C    |  | VER03360 |
| 1733 | IF(NSEP.GT.15) GO TO 1399                              | VER03370 |
|      | DC 1744 I=5,NSEP,2                                     | VER03380 |
|      | N = LSEP(I-1)  | VER03390 |
|      | J = J + 1  | VER03400 |
|      | CALL TRANS (M,N,J,J,1,0)                               | VER03410 |
|      | M = N  | VER03420 |
|      | N = LSEP(I)  | VER03430 |
|      | J = J + 1  | VER03440 |
|      | K = J + 7  | VER03450 |
|      | CALL TRANS (M,N,J,K,1,0)                               | VER03460 |
|      | M = N  | VER03470 |
| 1744 | J = J + 8  | VER03480 |
|      | GO TO 1877   | VER03490 |
| C    |  | VER03500 |
| C    | LOAD FUNCTIONAL RELATIONSHIPS                          | VER03510 |
| C    |  | VER03520 |
| 1755 | IF(NSEP.GT.19) GO TO 1399                              | VER03530 |
|      | DC 1788 I=4,NSEP                                       | VER03540 |
|      | N = LSEP(I)  | VER03550 |
|      | L = I - 3  | VER03560 |
|      | K = IFUN(L)  | VER03570 |
|      | L = JFUN(L)  | VER03580 |
| C    |  | VER03590 |
| C    | IF THIS IS AN X, Y OR Z FIELD, DETERMINE JUSTIFICATION | VER03600 |
| C    |  | VER03610 |
|      | IF(L.NE.IAEC(1)) GO TO 1777                            | VER03620 |
|      | L = LINEC(J-1)   | VER03630 |
|      | IF(L.EQ.IBLK.CF.L.EQ.IAEC(9)) GO TO 1766               | VER03640 |
|      | L = 1  | VER03650 |
|      | GO TO 1777   | VER03660 |
| 1766 | L = 0  | VER03670 |
| 1777 | CALL TRANS (M,N,J,K,L,0)                               | VER03680 |
|      | M = N  | VER03690 |
| 1788 | J = K + 1  | VER03700 |
|      | GO TO 1877   | VER03710 |
| C    |  | VER03720 |
| C    | IF THIS CARD LOOKS LIKE A SATELLITE NODE CARD, TEST IT | VER03730 |
| C    |  | VER03740 |
| 1799 | IF(I.NE.5) GO TO 1822                                  | VER03750 |
|      | IPT1 = N + 1   | VER03760 |
|      | IPT2 = N + 2   | VER03770 |
|      | IPT3 = N + 3   | VER03780 |
|      | IPT4 = N + 4   | VER03790 |
|      | IPT5 = IBLK  | VER03800 |
| C    |  | VER03810 |
| C    | CHECK FOR THE HISTOGRAM SATELLITE NODE CARD            | VER03820 |
| C    |  | VER03830 |
|      | IF(LINE1(IPT1).NE.IAEC(7)) GO TO 1800                  | VER03840 |
|      | IF(LINE1(IPT2).NE.IAEC(8)) GO TO 1800                  | VER03850 |



|      |   |          |
|------|---|----------|
|      | IF(LINE1(IPT3).NE.IABC(16))GO TO 1800             | VER03860 |
|      | IF(LINE1(IPT4).EQ.IAEC(17))GO TO 1855             | VER03870 |
| C    |   | VER03880 |
| C    | CHECK FOR THE SUBTRACT SATELLITE NCDE CARD        | VER03890 |
| C    |   | VER03900 |
| 1800 | IF(LINE1(IPT1).NE.IABC(16))GO TO 1811             | VER03910 |
|      | IF(LINE1(IPT2).NE.IABC(18))GO TO 1811             | VER03920 |
|      | IF(LINE1(IPT3).NE.IABC(2))GO TO 1811              | VER03930 |
|      | IF(LINE1(IPT4).EQ.IALC(17))GO TO 1844             | VER03940 |
| C    |   | VER03950 |
| C    | CHECK FOR THE SLACK HISTOGRAM NCDE CARD           | VER03960 |
| C    |   | VER03970 |
| 1811 | IF(LINE1(IPT1).NE.IABC(16))GO TO 1822             | VER03980 |
|      | IF(LINE1(IPT2).NE.IABC(10))GO TO 1822             | VER03990 |
|      | IF(LINE1(IPT3).NE.IABC(1))GO TO 1822              | VER04000 |
|      | IF(LINE1(IPT4).EQ.IAEC(9))GO TO 1855              | VER04010 |
| C    |   | VER04020 |
| C    | NO SATELLITES, RATHER, ANOTHER NCDE CARD, LOAD IT | VER04030 |
| C    |   | VER04040 |
| 1822 | MAX = NSEP  | VER04050 |
|      | IF(NSEP.GT.10) GO TO 1399                         | VER04060 |
|      | L = 0   | VER04070 |
|      | DO 1833 I=2,MAX                                   | VER04080 |
|      | N = LSEP(I)                                       | VER04090 |
|      | K = NCDE(I-1)                                     | VER04100 |
|      | IF(K.GE.29) L = 1                                 | VER04110 |
|      | LL = 0  | VER04120 |
|      | IF(K.GT.29) LL = 1                                | VER04130 |
|      | CALL TRANS (M,N,J,K,L,LL)                         | VER04140 |
|      | M = N   | VER04150 |
| 1833 | J = K + 1   | VER04160 |
|      | GO TO 1977  | VER04170 |
| C    |   | VER04180 |
| C    | LOAD THIS SATELLITE NCDE CARD                     | VER04190 |
| C    |   | VER04200 |
| 1844 | IPT5 = 1  | VER04210 |
| 1855 | CALL TRANS (M,N,9,12,1,0)                         | VER04220 |
|      | M = N   | VER04230 |
|      | J = 13  | VER04240 |
|      | DO 1866 I=3,NSEP                                  | VER04250 |
|      | N = LSEP(I)                                       | VER04260 |
|      | K = J + 7   | VER04270 |
|      | CALL TRANS (M,N,J,K,IPT5,0)                       | VER04280 |
|      | M = N   | VER04290 |
| 1866 | J = J + 8   | VER04300 |
| C    |   | VER04310 |
| C    | PUT THE RECONFIGURED CARD ON THE OUTPUT FILE      | VER04320 |
| C    |   | VER04330 |
| 1877 | IF(IFFCR.GT.0) GO TO 1311                         | VER04340 |
|      | WRITE (ICUT,1333) LINEC                           | VER04350 |
|      | GO TO 1122  | VER04360 |
| 1888 | END FILE ICUT                                     | VER04370 |
|      | CALL EXIT   | VER04380 |
|      | END   | VER04390 |
|      | SUBROUTINE TRANS (MX,NX,JX,KX,JUST,NCBLK)         | VER04400 |



|   |          |
|---|----------|
| COMMON LINEI(81), LINEC(80), IPRCR, IFIELD, ITLB, IBLK              | VER04410 |
| DIMENSION LINES(80)   | VER04420 |
| C   | VER04430 |
| C THIS SUBROUTINE'S MAIN FUNCTION IS THAT OF TRANSFERRING DATA FROM | VER04440 |
| C THE INPUT ARRAY TO THE OUTPUT ARRAY FOR A GIVEN DATA FIELD        | VER04450 |
| C   | VER04460 |
| IFIELD = IFIELD + 1   | VER04470 |
| M = MX + 1  | VER04480 |
| N = MX - 1  | VER04490 |
| IF(N.LT.M) RETURN   | VER04500 |
| J = JX  | VER04510 |
| K = KX  | VER04520 |
| C   | VER04530 |
| C REMOVE THE BLANKS IF REQUESTED & LOAD INTO A STORAGE ARRAY        | VER04540 |
| C   | VER04550 |
| NUMB = 0  | VER04560 |
| DO 1900 I=1,N   | VER04570 |
| IF(MBLK.NE.0) GO TO 1899  | VER04580 |
| IF(LINEI(I).EQ.IELK) GO TO 1900                                     | VER04590 |
| 1899 NUMB = NUMB + 1  | VER04600 |
| LINES(NUMB) = LINEI(I)  | VER04610 |
| 1900 CONTINUE   | VER04620 |
| C   | VER04630 |
| C IS THERE ENOUGH SPACE   | VER04640 |
| C   | VER04650 |
| L = K - J + 1   | VER04660 |
| IF(NUMB.LE.L) GO TO 1922  | VER04670 |
| WRITE (ITUE,1911) IFIELD  | VER04680 |
| 1911 FORMAT(/38F ***ERROR*** TOO MUCH DATA FOR FIELD #, I2)         | VER04690 |
| IPRCH = IPRCH + 1   | VER04700 |
| RETURN  | VER04710 |
| C   | VER04720 |
| C TRANSFER DATA EITHER RIGHT OR LEFT HAND JUSTIFICATION             | VER04730 |
| C   | VER04740 |
| 1922 DO 1933 I=1,NUMB   | VER04750 |
| L = NUMB - I + 1  | VER04760 |
| IF(JUST.EQ.0) LINEC(K) = LINES(L)                                   | VER04770 |
| IF(JUST.NE.0) LINEC(J) = LINES(I)                                   | VER04780 |
| J = J + 1   | VER04790 |
| 1933 K = K - 1  | VER04800 |
| RETURN  | VER04810 |
| END   | VER04820 |

PILL: VERTEDIT EXEC      A1    MIDWEST S+E COMPUTER CENTER

&CONTROL OFF

&TYPE ENTER FILENAME OF VERT INPUT FILE TO BE EDITED

&READ ARGS

&LEGSTACK

T

&END

EDIT &1 DATA &1

&CONTROL CFF

-INIT

&IF .&1 = . &GOTO -CCNT

&IF .&1 = .END &GOTO -FIN

&IF .&1 = .R &GOTO -RET

&IF .&1 = .4 &GOTO -END4

&IF .&1 = .3 &GOTO -END3

&IF .&1 = .2 &GOTO -END2

&IF .&1 = .1 &GOTO -END1

-CONT

&BEGTYPE

SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = CREATE A VERT PLOT DATA FILE
- 2 = EDIT AN EXISTING VERT PLOT DATA FILE
- 3 = DISPLAY A VERT PLOT
- 4 = SAMPLE VERT PLOT (TRCCF SUPPORT LEVEL II MANAGED  
ROUTINE ECP PROCESS -PHASE 1)
- R = RETURN TO THE MAIN MENU LEVEL
- END = END THE SESSION

&ENDTYPE

&READ ARGS

&GOTO -INIT

-END1

EX VERTPLT1

&GOTO -PASS

-END2

EX VERTPLT2

&GOTO -PASS

-END3

EX VERTPLT3

&GOTO -PASS

-END4

EX VERTPLT4

&GOTO -PASS

-PASS

&ARGS

&GOTO -INIT

-FIN

&GLOBAL = 2

&GOTO -RET

-RET

FILE: VERTFLT1 EXEC      A1    MIDWEST S+E COMPUTER CENTER

&CONTROL OFF  
&BEGTYPE

NOTE: TO BE CONSISTENT YOU SHOULD USE VP AS THE FIRST TWO LETTERS  
OF THE FILENAME. HOWEVER, IT IS NOT MANDATORY THAT YOU DO SO.

&END  
&TYPE  
&TYPE ENTER THE FILENAME FOR THE VERT PLOT FILE TO BE CREATED  
&READ ARGS  
EDIT &1 DATA A1

FILE: VERTPLT2 EXEC

A1 MIDWEST S+E COMPUTER CENTER

&CCNTRCL CFF

&TYPE

&TYPE ENTER FILENAME OF THE PLOT FILE TO BE EDITED

&READ ARGS

EDIT &1 DATA A1

FILE: VERTPLT3 EXEC

A1 MIDWEST S+E COMPUTER CENTER

&CONTROL OFF

&TYPE

&TYPE ENTER FILENAME

&READ ARGS

&BEGSTACK

1

?

&END

EX VERTPLCT &1



&CONTROL OFF

&BEGSTACK

1

W

0.

0.

35.

13.

C

&END

EX VERTPLCT VPECPT2R

&READ ARGS

&BEGTYPE

THE PLCT YOU JUST SAW WAS 35 INCHES LONG SCALED DOWN  
TO 8.5 X 11 INCHES SO THAT THE ENTIRE PLOT COULD BE  
VIEWED ON THE SCREEN.

WOULD YOU LIKE TO SEE A BLOWUP OF THE FIRST 11 INCHES  
OF THE PLCT ? ENTER YES/NO

&END

&READ ARGS

&IF &1 = NO &GOTO -END

&BEGSTACK

1

W

0.

0.

11.

8.5

C

&END

EX VERTPLCT VPECPT2R

&READ ARGS

&TYPE

&TYPE DO YOU WANT TO SEE THE NEXT 11 INCHES OF

&TYPE THE PLCT ? ENTER YES/NO

&READ ARGS

&IF &1 = NO &GOTO -END

&BEGSTACK

1

W

10.8

0.

11.

8.5

C

&END

EX VERTPLCT VPECPT2R

&READ ARGS

&TYPE

&TYPE DO YOU WANT TO SEE THE THIRD 11 INCH SECTION OF

&TYPE THE PLCT ? ENTER YES/NO

&READ ARGS

&IF &1 = NO &GOTO -END

FILE: VERTPLT4 EXEC      A1   MIDWEST S+E COMPUTER CENTER

&BEGSTACK

1

W

21.8

0.

11.

8.5

C

&END

EX VERTPLCT VPECPT2R

&READ ARGS

&TYPE

&TYPE DO YOU WANT TO SEE THE LAST 11 INCH SECTION OF

&TYPE THE PLCT ? ENTER YES/NO

&READ ARGS

&IF &1 = NO &GOTO -END

&BEGSTACK

1

W

32.8

0.

11.

8.5

C

&END

EX VERTPLCT VPECPT2R

&READ ARGS

-END

## TRCOP SUPPORT LEVEL II ROUTINE PHASE 1 ECP PROCESS

```

NODE0.    4.00  1.    1.    1  2ECP RECEIVED IN DRSTS-MPC
NODE5.5    4.00  1.    1.    2  2ECP REVIEW COMPLETED
NODE11.0   4.00  1.    1.    2  2ECP RECEIVED BY ELEMENTS
NODE16.5   4.00  1.    1.    2  2COMMENTS COMPLETED BY ELEMENTS
NODE22.0   3.50  1.    2.    2  2COMMENTS RECEIVED BY DRSTS-MPC
NODE27.5   2.00  1.    5.    2  3CONFIG CONTROL BOARD MEETS
NODE33.0   6.0   1.    1.    2  1ECP APPROVED
NODE33.0   4.0   1.    1.    2  1ECP DECISION DEFERED
NODE33.0   2.0   1.    1.    2  1ECP DISAPPROVED
ARC 1.     4.5   5.5   4.5    0  01001T2R      2 - 4 DAYS
ARC 1.     4.2   5.5   4.2    1  1CRSTS-MPC IDENTIFIES T, L, & P
ARC 6.5    4.5   11.0  4.5    0  01005T2R      4 - 6 DAYS
ARC 6.5    4.2   11.0  4.2    1  1CRSTS-MPC SENDS ECP TO ELEMENTS
ARC 12.0   4.5   16.5  4.5    0  01007T2R      15 DAYS
ARC 12.0   4.2   16.5  4.2    1  1ELEMENTS REVIEW & PROVIDE COMMENTS
ARC 17.5   4.5   22.0  4.5    0  01008T2R      3 - 5 DAYS
ARC 17.5   4.2   22.0  4.2    1  1ELEMENTS SEND COMMENTS TO CRSTS-MPC
ARC 23.0   4.0   27.5  4.0    0  01013T2R     11 - 13 DAYS
ARC 23.0   3.7   27.5  3.7    1  1CRSTS-MPC SCHEDULES CC BOARD MEETING
ARC 23.0   5.0   27.5  5.0    0  01009T2R      4 - 6 DAYS
ARC 23.0   4.7   27.5  4.7    1  1CRSTS-MPC COMPILES COMMENTS & SENDS TO CM
ARC 28.5   2.5   33.0  2.5    0  01017T2R      1 DAY      <.15>
ARC 28.5   2.2   33.0  2.2    1  1BCARC DISAPPROVES ECP
ARC 28.5   4.5   33.0  4.5    0  01016T2R      1 DAY      <.25>
ARC 28.5   4.2   33.0  4.2    1  1BOARD DEFERS DECISION ON ECP
ARC 28.5   6.5   33.0  6.5    0  01015T2R      1 DAY      <.60>
ARC 28.5   6.2   33.0  6.2    1  1BCARC APPROVES ECP
END

```

FILE: VERTPLCT EXEC

A1 MIDWEST S+E COMPUTER CENTER

&CONTROL OFF

FI 1 DISK &1 DATA A1 (RECFM F LRECL 80 BLOCK 30

FI 5 TERM

FI 6 TERM

FI 8 DISK TEMPB DATA T1 (RECFM F LRECL 120 BLOCK 120

FI 10 DISK TEMPPPLCT DATA T1 (RECFM F LRECL 133 BLOCK 133

VERTPLCT

```

COMMON IRROR, ICUT
DIMENSION IEUF(1000), ITYPE(4), LOGI(4,4), LOGO(4,6), ID(72),
INAME(44), IHCL(44)
DATA ITYPE/4HNCDE,4HARC,4HCIRL,4HENC /
DATA LOGI,LOGO/1HI,1HA,1FI,1FT,1FA,1FN,1FC,1H,1HP,1HA,1HN,1HD,
11H,1HC,1HR,1H,1FT,1FE,1FR,1FM,1FA,1FL,1FL,1H,1H,1HM,1HC,1H,
21HF,1HL,1HT,1HI,1FF,1FL,1FT,1F2,1FF,1FL,1FT,1H3/
CALL INITT(240)
CALL TERM(3,1024)
CALL FLCTS (IEUF,1000,14)

C
C I/O PARAMETERS AND SHEET DIMENSIONS
C
C INPT = 5
C INPT = 1
C ICUT = 5
C ICUT = 10
C IWK1 = 8
C BCTTCM = 1.5
C SPAN = 48.0
C WIDTH = 10.5
C WIDTH = 29.
C SPAN = 400.

C
C READ RUN ID, SCALE AND LETTER HEIGHT, THEN INITIALIZE
C IPEN1 = CCLOR OF THE NOCES
C IPEN2 = CCLOR OF THE SYMBOLS
C IPEN3 = CCLOR OF THE ARCS
C
1111 READ (INPT,1122,END=1833) ID, SCALE, HIGH, NREP
1122 FORMAT (72A1, F4.0, F3.0, 11)
WRITE (ICUT,1133) ID, SCALE, HIGH, NREP
11330FORMAT (1H1, 72A1, 1X, 7HSCALE =, F5.1, 2X, 15HLETTER HEIGHT =,
1F4.2, 2X, 20HNC. OF REPETITIONS =, 12/ 1FC, 20X, 18HINPLT CARD CULVTP00340
2UMNS/ 5H 1-4, 4X, 4F5-10, 3X, 5F11-16, 3X, 5H17-22, 3X, 15H23-282VTP00350
39-3233-36, 20X, 5F37-80, 25X, 4FXMIN, 6X, 4HMAX, 6X, 4HYMIN, 6X, VTP00360
44HYMAX) VTP00370
IRROR = 0 VTP00380
IF(SCALE.LT.0.0) CALL ERROR (1144) VTP00390
IF(HIGH.LT.0.0) CALL ERROR (1155) VTP00400
IF(SCALE.LE.0.0) SCALE = 1.0 VTP00410
IF(HIGH.LE.0.0) HIGH = 0.1 VTP00420
XMIN = 9.0E70 VTP00430
XMAX = -9.0E70 VTP00440
YMIN = 9.0E70 VTP00450
YMAX = -9.0E70 VTP00460
KLCUT = 0 VTP00470
ITAL = 0 VTP00480
RLWIND IWK1 VTP00490
IPEN1 = 1 VTP00500
IPEN2 = 1 VTP00510
IPEN3 = 1 VTP00520
NUM = 405 VTP00530
C WRITE (10,10) NUM VTP00540
10 FORMAT (5X, 'IN AT STATEMENT ', 15) VTP00550

```

|   |  |          |
|---|--|----------|
| C |  | VTP00560 |
| C | READ A DATA CARD - NODE, ARC OR CIRCLE CARD                        | VTP00570 |
| C |  | VTP00580 |
|   | 1166 READ (INPT,1177,END=1844) ICF, XC, YC, X1, Y1, LIN, LOT, NAME | VTP00590 |
|   | 1177 FORMAT (A4, 4F6.0, 2I4, 4A1)                                  | VTP00600 |
|   | X2 = X0  | VTP00610 |
|   | Y2 = Y0  | VTP00620 |
|   | X3 = X1  | VTP00630 |
|   | Y3 = Y1  | VTP00640 |
|   | J = 0  | VTP00650 |
|   | DO 1199 I=1,44   | VTP00660 |
|   | IHCLO(I) = LCGI(4,2)   | VTP00670 |
|   | IF(J.NE.0) GO TO 1188  | VTP00680 |
|   | IF(NAME(I).EQ.LCGI(4,2)) GO TO 1199                                | VTP00690 |
|   | 1188 J = J + 1   | VTP00700 |
|   | IHCLO(J) = NAME(I)   | VTP00710 |
|   | 1199 CONTINUE  | VTP00720 |
|   | IF(J.EQ.0) GO TO 1222  | VTP00730 |
|   | DO 1200 I=1,J  | VTP00740 |
|   | K = J - I + 1  | VTP00750 |
|   | IF(IHCLO(K).NE.LCGI(4,2)) GO TO 1211                               | VTP00760 |
|   | 1200 CONTINUE  | VTP00770 |
|   | 1211 J = K   | VTP00780 |
|   | 1222 Z = HIGH*FLCAT(J)   | VTP00790 |
|   | ANGLE = 0.0  | VTP00800 |
| C |  | VTP00810 |
| C | NODE CARD  | VTP00820 |
| C |  | VTP00830 |
|   | IF(ICF.NE.ITYPE(1)) GO TO 1411                                     | VTP00840 |
|   | JDF = 1  | VTP00850 |
|   | IF(X1.EQ.0.0) X1 = 5.0*HIGH  | VTP00860 |
|   | IF(X1.LT.0.0) CALL ERROR (1233)                                    | VTP00870 |
|   | IF(Y1.EQ.0.0) Y1 = 10.0*HIGH                                       | VTP00880 |
|   | IF(Y1.LT.0.0) CALL ERROR (1244)                                    | VTP00890 |
|   | XM = X0 + 0.5*X1   | VTP00900 |
|   | X1 = X0 + X1   | VTP00910 |
|   | Y1 = Y0 + Y1   | VTP00920 |
| C |  | VTP00930 |
| C | COMPUTE THE NODE NAME BOUNDARY                                     | VTP00940 |
| C |  | VTP00950 |
|   | IF(J.GT.0) GO TO 1266  | VTP00960 |
|   | CALL ERROR (1255)  | VTP00970 |
|   | GO TO 1277   | VTP00980 |
|   | 1266 XN = XM - Z*0.5 + 0.25*HIGH                                   | VTP00990 |
|   | YN = Y0 - 2.0*HIGH   | VTP01000 |
|   | IF(XN.LT.XMIN) XMIN = XN   | VTP01010 |
|   | IF(YN.LT.YMIN) YMIN = YN   | VTP01020 |
|   | X = XN + Z   | VTP01030 |
|   | IF(X.GT.XMAX) XMAX = X   | VTP01040 |
| C |  | VTP01050 |
| C | CHECK THE LOGIC  | VTP01060 |
| C |  | VTP01070 |
|   | 1277 IF(LIN.LT.1.OR.LIN.GT.8) CALL ERROR (1288)                    | VTP01080 |
|   | IF(LIN.GT.4) GO TO 1322  | VTP01090 |
|   | IF(LCT.LT.1.OR.LCT.GT.6) CALL ERROR (1299)                         | VTP01100 |



```

      X = 2.5*HIGH
      IF(X3.LT.X) CALL ERROR (1300)
      Y = 4.5*HIGH
      IF(Y3.LT.Y) CALL ERROR (1311)
      GC TC 1522
C
C      COMPUTE THE SPECIAL LOGIC SYMBOL BOUNDARY
C
1322 IF(LIN.NE.5) GC TC 1333
      X = 4.5
      Z = 11.0
      GC TC 1344
1333 IF(LIN.NE.6) GC TC 1366
      X = 5.5
      Z = 13.0
1344 IF(LCT.EQ.0.0) CALL ERROR (1355)
1366 IF(LIN.NE.7) GC TC 1388
      X = 3.5
      Z = 9.0
      IF(LCT.LE.0.0) CALL ERROR (1377)
1388 IF(LIN.NE.8) GC TC 1400
      X = 2.0
      Z = 4.0
      IF(LCT.NE.0.0) CALL ERROR (1399)
1400 X = XM - X*HIGH
      Z = X + Z*HIGH
      Y = Y1 + 2.0*HIGH
      IF(X.LT.XMIN) XMIN = X
      IF(Z.GT.XMAX) XMAX = Z
      IF(Y.GT.YMAX) YMAX = Y
      GC TC 1522
C
C      ARC CARD
C
1411 IF(IDF.NE.ITYPE(2)) GC TO 1499
      NUM = 1365
C      WRITE (10,10) NUM
      JDF = 2
      IF(J.EQ.0) GC TC 1522
      XN = X0
      YN = Y0
      X = X1
      Y = Y1
      IF(X1 - X0)1422,1444,1433
1422 XN = X1
      YN = Y1
      X = X0
      Y = Y1
1433 ANGLE = (Y - YN)/(X - XN)
      IF(ABS(ANGLE).LT.6.0) GC TC 1466
1444 CALL ERROR (1455)
      GC TC 1522
1466 ANGLE = ATAN(ANGLE)
      SINZ = SIN(ANGLE)
      COSZ = COS(ANGLE)

```

VTP01113  
VTP01120  
VTP01130  
VTP01140  
VTP01150  
VTP01160  
VTP01170  
VTP01180  
VTP01190  
VTP01200  
VTP01210  
VTP01220  
VTP01230  
VTP01240  
VTP01250  
VTP01260  
VTP01270  
VTP01280  
VTP01290  
VTP01300  
VTP01310  
VTP01320  
VTP01330  
VTP01340  
VTP01350  
VTP01360  
VTP01370  
VTP01380  
VTP01390  
VTP01400  
VTP01410  
VTP01420  
VTP01430  
VTP01440  
VTP01450  
VTP01460  
VTP01470  
VTP01480  
VTP01490  
VTP01500  
VTP01510  
VTP01520  
VTP01530  
VTP01540  
VTP01550  
VTP01560  
VTP01570  
VTP01580  
VTP01590  
VTP01600  
VTP01610  
VTP01620  
VTP01630  
VTP01640  
VTP01650

```

TANZ = SINZ/CCSZ
IF(ANGLE.LE.0.0) GO TO 1477
X = HIGH + HIGH*SINZ
Y = HIGH*(2.0*TANZ + 1.0/CCSZ)
Y = Y*Y + HIGH*HIGH
Y = SQRT(Y - X*X)
GO TO 1438
1477 X = HIGH
Y = HIGH*((1.0 - ABS(SINZ))/ABS(CCSZ))
1488 XN = XN + X
YN = YN + Y
IF(YN.GT.YMAX) YMAX = YN
X = XN + Z*CCSZ
Y = YN + Z*SINZ
IF(X.GT.XMAX) XMAX = X
IF(Y.GT.YMAX) YMAX = Y
IF(Y.LT.YMIN) YMIN = Y
GO TO 1522
C
C CIRCLE CARD
C
1499 IF(ICF.NE.ITYPE(3)) GO TO 1555
NUM = 1765
C WRITE (10,10) NUM
JDF = 3
IF(X1.EQ.0.0) X1 = 2.5*HIGH
IF(X1.LT.0.0) CALL ERRCR (1500)
IF(J.LE.0) GO TO 1511
XN = X0 - Z*0.5 + 0.25*HIGH
YN = Y0 - 0.5*HIGH
IF(XN.LT.XMIN) XMIN = XN
IF(YN.LT.YMIN) YMIN = YN
X = XN + Z
Y = Y + HIGH
IF(X.GT.XMAX) XMAX = X
IF(Y.GT.YMAX) YMAX = Y
1511 ANGLE = X1
X1 = X0 + ANGLE
X0 = X0 - ANGLE
Y1 = Y0 + ANGLE
Y0 = Y0 - ANGLE
C
C CHECK MAX-MINS OF THE OUTER BOUNDARY OF THE MAJOR ITEM
C
C1522 WRITE (IWK1) IHCLC,J,JDF,X0,Y0,X1,Y1,XN,YN,ANGLE,LIN,LOT
1523 FORMAT (4A1, 2I5, 7F8.2, 2I5)
1522 WRITE (IWK1,1523) IHCLC,J,JDF,X0,Y0,X1,Y1,XN,YN,ANGLE,LIN,LOT
NUM = 1975
C WRITE (10,10) NUM
KCOUNT = KCOUNT + 1
IF(X0.LT.XMIN) XMIN = X0
IF(X0.GT.XMAX) XMAX = X0
IF(X1.LT.XMIN) XMIN = X1
IF(X1.GT.XMAX) XMAX = X1
IF(Y0.LT.YMIN) YMIN = Y0

```

VTP0166J  
VTP0167J  
VTP0168C  
VTP0169J  
VTP0170J  
VTP0171J  
VTP0172J  
VTP0173J  
VTP0174J  
VTP0175J  
VTP0176J  
VTP0177J  
VTP0178J  
VTP0179J  
VTP0180J  
VTP0181J  
VTP0182J  
VTP0183J  
VTP0184J  
VTP0185J  
VTP0186J  
VTP0187J  
VTP0188J  
VTP0189J  
VTP0190J  
VTP0191J  
VTP0192J  
VTP0193J  
VTP0194J  
VTP0195J  
VTP0196J  
VTP0197J  
VTP0198J  
VTP0199J  
VTP0200J  
VTP0201J  
VTP0202J  
VTP0203J  
VTP0204J  
VTP0205J  
VTP0206J  
VTP0207J  
VTP0208J  
VTP0209J  
VTP0210J  
VTP0211J  
VTP0212J  
VTP0213J  
VTP0214J  
VTP0215J  
VTP0216J  
VTP0217J  
VTP0218J  
VTP0219J  
VTP0220J

```

      IF(YO.GT.YMAX) YMAX = YO
      IF(Y1.LT.YMIN) YMIN = Y1
      IF(Y1.GT.YMAX) YMAX = Y1
1533 WRITE (ICUT,1544) IDF,X2,Y2,X3,Y3,LIN,LGT,NAME,XMIN,XMAX,YMIN,YMAX
1544 FORMAT (1H , A4, 4F8.2, 2I5, 4A1, 4F10.2)
      GC TO 1166
C
C      END CARD
C
1555 IF(ILF.EQ.ITYPE(4)) GC TO 1577
      CALL ERFOR (1556)
      GC TO 1533
C
C      CHECK THE TITLE DIMENSIONS
C
1577 K = 0
      NUM = 2195
C      WRITE (10,10)  NUM
      L = 0
      DO 1588 I=1,72
        J = 73 - I
        IF(K.EQ.0.AND.ID(I).NE.LOGI(4,2)) K = I
1588 IF(L.EQ.0.AND.ID(J).NE.LOGI(4,2)) L = J
        IF(K.EQ.0) GO TO 1600
        XM = L - K + 1
        Z = 2.0*HIGH
        X = XMIN + (XMAX - XMIN)*0.5 - 0.5*XM*Z
        IF(X.LT.XMIN) XMIN = X
        XO = X + XM*Z
        IF(XO.GT.XMAX) XMAX = XO
        Y = YMAX + 1.0 + 2.0*Z
        IF(Y.GT.YMAX) YMAX = Y
        Y = Y - Z
        WRITE (ICUT,1599) XMIN, XMAX, YMIN, YMAX
1599 FORMAT (33H0AFTER PLOTTING THE TITLE, XMIN =, F10.2, 8H  XMAX =,
1600 F10.2, 8H  YMIN =, F10.2, 8H  YMAX =, F10.2)
      Y0 = YMAX - YMIN
      Y1 = Y0*SCALE
      IF(Y1.LE.WIDTH) GC TO 1622
      SCALE = WIDTH/Y0
      WRITE (ICUT,1611) SCALE
1611 FORMAT (33H0X DIMENSION FORCES SCALE DOWN TO, F6.2)
1622 X0 = XMAX - XMIN
      X1 = X0*SCALE
      IF(X1.LE.SPAN) GO TO 1644
      SCALE = SPAN/X0
      WRITE (ICUT,1633) SCALE
1633 FORMAT (33H0X DIMENSION FORCES SCALE DOWN TO, F6.2)
1644 IF(SCALE.LT.0.05) CALL ERRCR (1655)
C
C      IF NO ERRORS, PLOT THE NETWORK FOR THE NUMBER OF REPETITIONS RE-
C      QUESTED, FIRST READY THE PLOTTER
C
C      WRITE (10,10)  NUM
C      IF(ERRCR.GT.0) GC TO 1111

```

|      |  |          |
|------|--|----------|
|      | CALL FACTOR (1.0)  | VTF02760 |
| C    | CALL FLCT (2.0,-40.0,-3)                                     | VTP02770 |
| C    | CALL FLCT (0.0,ECTTCN,-3)                                    | VTP02780 |
|      | CALL FLCT (0.0, 0.0, -3)                                     | VTP02790 |
|      | CALL FACTOR (SCALE)  | VTP02800 |
|      | NUM = 2595   | VTP02810 |
| C    | WRITE (10,10) NUM  | VTP02820 |
| 1660 | REWIND IWK1  | VTP02830 |
|      | CALL NEWPAC  | VTP02840 |
|      | CALL TSEND   | VTP02850 |
|      | IDF = 0  | VTP02860 |
| C    |  | VTP02870 |
| C    | REAL A CARD AS STORED ON DISK                                | VTP02880 |
| C    |  | VTP02890 |
| 1666 | IDF = IDF + 1  | VTP02900 |
|      | CALL TSEND   | VTP02910 |
|      | IF (IDF.GT.KCUNT) GO TO 1800                                 | VTP02920 |
|      | READ (IWK1,1523) IFCLC,J,JCF,X0,Y0,X1,Y1,XN,YN,ANGLE,LIN,LUT | VTP02930 |
|      | NUM = 2675   | VTP02940 |
| C    | WRITE (10,10) NUM  | VTP02950 |
|      | X0 = X0 - XMIN   | VTP02960 |
|      | Y0 = Y0 - YMIN   | VTP02970 |
|      | X1 = X1 - XMIN   | VTP02980 |
|      | Y1 = Y1 - YMIN   | VTP02990 |
|      | XN = XN - XMIN   | VTP03000 |
|      | YN = YN - YMIN   | VTP03010 |
| C    |  | VTP03020 |
| C    | NODE CARD  | VTP03030 |
| C    |  | VTP03040 |
|      | IF (JCF.NE.1) GO TO 1744                                     | VTP03050 |
| C    | CALL NEWPEN (IPEN2)  | VTP03060 |
|      | DC 1677 I=1,J  | VTP03070 |
|      | CALL SYMCL (XN,YN,HIGH,IFCLC(1),0.0,1)                       | VTP03080 |
|      | CALL TSEND   | VTP03090 |
| 1677 | XN = XN + HIGH   | VTP03100 |
| C    | CALL NEWPEN (IPEN1)  | VTP03110 |
|      | CALL FLCT (X0,Y0,3)  | VTP03120 |
|      | CALL FLCT (X1,Y0,2)  | VTP03130 |
|      | CALL FLCT (X1,Y1,2)  | VTP03140 |
|      | CALL FLCT (X0,Y1,2)  | VTP03150 |
|      | CALL FLCT (X0,Y0,2)  | VTP03160 |
|      | Z = (X1 - X0)*0.5  | VTP03170 |
|      | XM = X0 + Z  | VTP03180 |
|      | IF (LIN.GT.4) GO TO 1699                                     | VTP03190 |
| C    |  | VTP03200 |
| C    | FLCT THE SPLIT NODE DIVIDER AND LOGIC                        | VTP03210 |
| C    |  | VTP03220 |
|      | CALL FLCT (XM,Y0,3)  | VTP03230 |
|      | CALL FLCT (XM,Y1,2)  | VTP03240 |
|      | X0 = XM - Z*0.5 - 0.25*HIGH                                  | VTP03250 |
|      | X1 = X0 + Z  | VTP03260 |
|      | Y0 = Y0 + (Y1 - Y0)*0.5 + 1.75*HIGH                          | VTP03270 |
|      | Y1 = 1.5*HIGH  | VTP03280 |
| C    | CALL NEWPEN (IPEN2)  | VTP03290 |
|      | DC 1698 I=1,4  | VTP03300 |

|   |          |
|---|----------|
| CALL SYMBCL (X0,Y0,HIGH,LCGI(I,LIN),0.0,1)          | VTP03310 |
| CALL SYMBCL (X1,Y0,HIGH,LCCC(I,LCT),0.0,1)          | VTP03320 |
| 1688 Y0 = Y0 - Y1                                   | VTP03330 |
| NUM = 3745  | VTP03340 |
| C WRITE (10,10) NUM                                 | VTP03350 |
| GC TC 1666  | VTP03360 |
| C   | VTP03370 |
| C PLCT THE SPECIAL MODE LOGIC                       | VTP03380 |
| C   | VTP03390 |
| 1699 Y0 = Y1 + HIGH                                 | VTP03400 |
| C CALL NEWFEN(IFEN2)                                | VTP03410 |
| IF(LIN.NE.5) GC TC 1700                             | VTP03420 |
| X0 = XM - 4.5*HIGH                                  | VTP03430 |
| CALL SYMBCL (X0,Y0,HIGH,7FCMPARE,C,C,7)             | VTP03440 |
| Z = 7.0   | VTP03450 |
| 1700 IF(LIN.NE.6) GC TC 1711                        | VTP03460 |
| X0 = XM - 5.5*HIGH                                  | VTP03470 |
| CALL SYMBCL (X0,Y0,HIGH,9FPREFERRED,C,C,9)          | VTP03480 |
| Z = 9.0   | VTP03490 |
| 1711 IF(LIN.NE.7) GC TC 1722                        | VTP03500 |
| X0 = XM - 3.5*HIGH                                  | VTP03510 |
| CALL SYMBCL (X0,Y0,HIGH,5FQUEUE,C,C,5)              | VTP03520 |
| Z = 5.0   | VTP03530 |
| 1722 IF(LIN.NE.8) GC TC 1733                        | VTP03540 |
| X0 = XM - 2.0*HIGH                                  | VTP03550 |
| CALL SYMBCL (X0,Y0,HIGH,4FSCRT,0.0,4)               | VTP03560 |
| GC TC 1666  | VTP03570 |
| 1733 X0 = X0 + Z*HIGH                               | VTP03580 |
| Z = LCT   | VTP03590 |
| CALL NUMBER (X0,Y0,HIGH,Z,0.0,-1)                   | VTP03600 |
| NUM = 3295  | VTP03610 |
| C WRITE (10,10) NUM                                 | VTP03620 |
| GC TC 1666  | VTP03630 |
| C   | VTP03640 |
| C ARC CARD  | VTP03650 |
| C   | VTP03660 |
| 1744 IF(JLF.NE.2) GC TC 1777                        | VTP03670 |
| IF(J.EQ.0) GC TC 1766                               | VTP03680 |
| X3 = COS(ANGLE)*HIGH                                | VTP03690 |
| Y3 = SIN(ANGLE)*HIGH                                | VTP03700 |
| ANGLE = ANGLE*57.296                                | VTP03710 |
| C CALL NEWFEN(IFEN2)                                | VTP03720 |
| DC 1755 I=1,J                                       | VTP03730 |
| CALL SYMBCL (XM,YN,HIGH,IFCLC(I),ANGLE,I)           | VTP03740 |
| XM = XM + X3  | VTP03750 |
| 1755 YN = YN + Y3                                   | VTP03760 |
| 1766 IF(LCT.NE.0) GC TC 1666                        | VTP03770 |
| C CALL NEWFEN(IFEN3)                                | VTP03780 |
| CALL PLCT (X0,Y0,3)                                 | VTP03790 |
| C IF(LIN.EQ.0) CALL ARCFD (X0,Y0,X1,Y1,HIGH,C,C,16) | VTP03800 |
| IF(LCT.EQ.0) CALL PLCT (X1,Y1,2)                    | VTP03810 |
| IF(LIN.EQ.0) CALL ARCFD (X0,Y0,X1,Y1,HIGH)          | VTP03820 |
| GC TC 1666  | VTP03830 |
| C   | VTP03840 |
| C CIRCLE CARD                                       | VTP03850 |



|      |   |          |
|------|---|----------|
| C    |   | VTP03860 |
| 1777 | IF(J.LE.0) GO TO 1799                         | VTP03870 |
| C    | CALL NEWPEN(IPEN2)                            | VTP03880 |
|      | DC 1788 I=1,J                                 | VTP03890 |
|      | CALL SYMBOL (XN,YN,HIGH,IFCLL(1),0.0,1)       | VTP03900 |
| 1788 | XN = XN + HIGH                                | VTP03910 |
| 1799 | IF(LCT.NE.0) GO TO 1666                       | VTP03920 |
|      | Y1 = Y1 - ANGLE                               | VTP03930 |
| C    | CALL NEWPEN(IPEN1)                            | VTP03940 |
| C    | CALL CIRCLE (X1,Y1,0.0,360.0,ANGLE,ANGLE,C.C) | VTP03950 |
|      | CALL CIRCLE (X1,Y1,ANGLE)                     | VTP03960 |
| C    | WRITE (10,10) NUM                             | VTP03970 |
|      | GO TO 1666                                    | VTP03980 |
| C    |   | VTP03990 |
| C    | PUT TITLE LN                                  | VTP04000 |
| C    |   | VTP04010 |
| 1800 | IF(K.EQ.0) GO TO 1822                         | VTP04020 |
|      | X1 = X - XMIN                                 | VTP04030 |
|      | Y1 = Y - YMIN                                 | VTP04040 |
| C    | CALL NEWPEN(IPEN2)                            | VTP04050 |
|      | Z = 2.0*HIGH                                  | VTP04060 |
|      | DC 1811 I=K,L                                 | VTP04070 |
|      | CALL SYMBOL (X1,Y1,Z,IC(1),0.0,1)             | VTP04080 |
| 1811 | X1 = X1 + Z                                   | VTP04090 |
| 1822 | ITAL = ITAL + 1                               | VTP04100 |
|      | X = XMAX - XMIN                               | VTP04110 |
| C    | CALL PLOT (X,0.0,-3)                          | VTP04120 |
|      | CALL PLOT (0.0,0.0,-3)                        | VTP04130 |
|      | IF (ITAL.LT.NREF) GO TO 1660                  | VTP04140 |
| C    | WRITE (10,10) NUM                             | VTP04150 |
|      | GO TO 1111                                    | VTP04160 |
| C    |   | VTP04170 |
| C    | CLOSE CUT                                     | VTP04180 |
| C    |   | VTP04190 |
| 1833 | CALL TSEND                                    | VTP04200 |
|      | CALL PLOT (0.0,0.0,999)                       | VTP04210 |
|      | STOP  | VTP04220 |
| 1844 | CALL ERROR (1855)                             | VTP04230 |
|      | STOP 13                                       | VTP04240 |
|      | END   | VTP04250 |
|      | SUBROUTINE ERROR (I)                          | VTP04260 |
|      | COMMON IERR, ICUT                             | VTP04270 |
|      | IERR = IERR + 1                               | VTP04280 |
|      | WRITE (ICUT,1866) IERR, I                     | VTP04290 |
| 1866 | FORMAT (1H0, 14, 17H. E R R O R NC., 16)      | VTP04300 |
|      | RETURN  | VTP04310 |
|      | END   | VTP04320 |
|      | SUBROUTINE ARCHC (X0,Y0,X1,Y1,HIGH)           | VTP04330 |
| C    | ASSUMES ALL LINES ARE VERTICAL OR HORIZONTAL  | VTP04340 |
|      | HIGHX1 = -HIGH                                | VTP04350 |
|      | HIGHX2 = -HIGH                                | VTP04360 |
|      | HIGHY1 = HIGH                                 | VTP04370 |
|      | HIGHY2 = -HIGH                                | VTP04380 |
|      | IF (X1 .EQ. X0) HIGHX1 = HIGH                 | VTP04390 |
|      | IF (X0 .GT. X1) HIGHX1 = HIGH                 | VTP04400 |



```

      IF (X0 .GT. X1) HIGHX2 = HIGHX1
      IF (Y1 .GT. Y0) HIGHY1 = HIGHY0
      IF (Y0 .GT. Y1) HIGHY2 = HIGHY1
      X = X1 + HIGHX1
      Y = Y1 + HIGHY1
      CALL FLCT (X,Y,3)
      CALL FLCT (X1,Y1,2)
      X = X1 + HIGHX2
      Y = Y1 + HIGHY2
      CALL FLCT (X,Y,2)
      RETURN
    END
    SUBROUTINE CIRC (X,Y,RADIUS)
      CALL FLCT (X,Y,3)
      X = X - RADIUS
      DO 50 J=1,360
        ANGLE = J*.0174533
        X1 = X + (RADIUS * COS(ANGLE))
        Y1 = Y + (RADIUS * SIN(ANGLE))
        CALL FLCT (X1,Y1,2)
      CONTINUE
      RETURN
    END

```

50

```

VTP04410
VTP04420
VTP04430
VTP04440
VTP04450
VTP04460
VTP04470
VTP04480
VTP04490
VTP04500
VTP04510
VTP04520
VTP04530
VTP04540
VTP04550
VTP04560
VTP04570
VTP04580
VTP04590
VTP04600
VTP04610
VTP04620
VTP04630

```

EC CONTROL CFF

-INIT

EIF .E1 = . EGCTO -CENT

```

&IF .&1 = .END &GCTC -FIN

```

8IF .81 = .R 8GCTO -RET

EIF .&1 = .5      &GLTC -END5

EIF .E1 = .4 EGCTU -END4

EIF .E1 = .3     ECTC -END3

```

&IF .&1 = .2      &GOTO -END2

```

```

      &IF .&1 = .1      &GCTC -END1

```

-CONT

8B E G T Y F E

SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

```
1      =  DISPLAY VERT GRAPHICS DATA FILES USING TELEGRAF BANKDATA FILES
```

```
2      =  CREATE A VERT GRAPHICS DATA FILE
```

```
3      =  EDIT AN EXISTING VERT GRAPHICS DATA FILE
```

4 = DISPLAY A VERT GRAPHICS DATA FILE WHICH WAS CREATED MANUALLY

5 = SAMPLE VERT GRAPHS (SCHEDULE, COST, AND PERFORMANCE CHARTS  
FOR THE COBRA FACTS DRA)

R = RETURN TO THE MAIN MENU LEVEL

END = END THE SESSION

ENDTYPE

LEAD ARGS

EGC TC -INIT

-E N D 1

EX VERTGRFL

EG CTC - PASS

- E N D 2

EX VERTGRF2

EGOTC -PASS

-END3

EX VERTGRF3

EG LTC - PASS

-END 4

EX VERTGRF4

EGOTC -PASS

-PASS

## LARGS

LGCTC -INIT

-FIN

EG LCEAL1 = 2

LG CTC -RET

-KET

```
&CCNTRCL OFF
&TYPE
&TYPE ARE YOU USING A 4027 COLOR GRAPHICS TERMINAL ? ENTER YES/NO
&READ ARGS
&IF &1 = YES &GOTO -COLOR
CCFY TAGPRO 4014 A1 TAGPRC DATA A1 (REPLACE
&GOTO -NEXT
-CCLCR
COPY TAGPRO 4027 A1 TAGPRO DATA A1 (REPLACE
-NEXT
&TYPE
&TYPE DID YOU RUN VERT CNLINE ? ENTER YES/NO
&READ ARGS
&IF &1 = NO &GOTO -CFFLINE
COPY PRONLINE DATA A1 PRM DATA A1 (REPLACE
-INIT
COPY VBANKNAM DATA A1 TEMPCRAY DATA A1 (REPLACE
&ERROR &GOTO -END
&BEGSTACK
TCP
/BANKDATA
GET VRANKNAM DATA A1 1 1
VERIFY OFF
C ///
C /$///
FILE
&EN
EDIT VERTTELE DATA A1
FI 2 DISK VTITLE DATA A1
VTITLE
&BEGSTACK
VERIFY OFF
DOWN 8
GET VTITLE DATA A1 1 2
FILE
&END
EDIT VERTTELE DATA A1
&BEGSTACK
VERTTELE (XEQ
&END
EXEC TELEGRAF
&BEGSTACK
VERIFY OFF
DOWN 9
DELETE 2
/BANKDATA
DOWN
DELETE
FILE
&END
EDIT VERTTELE DATA A1
&BEGSTACK
VERIFY OFF
DOWN
DELETE
```

FILE: VERTGRF1 EXEC      A1    MIDWEST S+E COMPUTER CENTER

```
FILE
&END
* EDIT VBANKNAM DATA A1
&GOTC -INIT
-CFFLINE
&BEGTYPE

HAVE ALL VERT OFFLINE JOBS COMPLETED ? ENTER YES/NO
&END
&READ ARGS
&IF &1 = NO &GOTO -MSG
ACCESS 194 W
-BEGIN
&BEGTYPE
```

ENTER THE UNIQUE FILENAME OF THE VERT JOB RUN  
(SIX CHARACTERS MAX)

```
&END
&READ ARGS
&VBANKNAM = &CONCAT VB &1
&PRM = &CONCAT PR &1
CCPY &PRM DATA W1 PRM DATA A1 (REPLACE
-BEGIN2
CCPY &VBANKNAM DATA W1 TEMPORARY DATA W1 (REPLACE
&ERROR &GOTO -CONT
&BEGSTACK
TCP
/BANKDATA
&END
&STACK GET &VBANKNAM DATA W1 1 1
&BEGSTACK
VERIFY OFF
C ///
C /$/
FILE
&END
EDIT VERTTELW DATA W1
FI 2 DISK VTITLE DATA W1
VTITLE
&BEGSTACK
VERIFY OFF
DCWN 8
GET VTITLE DATA W1 1 2
FILE
&END
EDIT VERTTELW DATA W1
&BEGSTACK
VERTTELW (XEG
&END
EXEC TELEGRAF
&BEGSTACK
VERIFY OFF
DCWN 9
DELETE 2
```

FILE: VERTGRF1 EXEC

A1 MIDWEST S+E COMPUTER CENTER

```
/BANKDATA
DCW
DELETE
FILE
&END
EDIT VERTTELW DATA W1
&STACK DOWN
&STACK DELETE
&STACK FILE
EDIT &VBANKNAM DATA W1
&GOTO -BEGIN2
-CONT
ERASE &PRM DATA W1
&TYPE
&TYPE DO YOU WANT TO DISPLAY GRAPHS FOR ANOTHER VERT JOB RUN OFFLINE
&TYPE
&TYPE ENTER YES/NO
&READ ARGS
&IF &1 = YES &GOTO -BEGIN
RELEASE 194
ACCESS 194 E/A
&GOTO -FIN
-MSG
&BEGTYPE
```

YOU CAN'T DISPLAY VERT GRAPHS USING TELEGRAF BANKDATA FILES  
UNTIL ALL VERT OFFLINE JOBS HAVE COMPLETED.

```
&END
&READ ARGS
&GOTO -FIN
-END
ERASE FRONLINE DATA A1
-FIN
ERASE PRM DATA A1
CP SET MSG ON
```

FILE: VTITLE FORTRAN AT MIDWEST S&E COMPUTER CENTER

```
DIMENSION ITITLE(18), IDIMEN(15)
WRITE(6,3)
3 FORMAT(///,' ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE '/',
1 ' QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>')
READ(5,4) ITITLE
4 FORMAT(18A4)
WRITE(6,6)
6 FORMAT(///,' ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE '/',
1 ' QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>')
READ(5,7) IDIMEN
7 FORMAT(15A4)
WRITE(2,8) ITITLE
8 FORMAT(6HTITLE ,18A4)
WRITE(2,9) IDIMEN
9 FORMAT(16HX AXIS LABEL IS ,15A4)
STOP
END
```

VTI00010  
VTI00020  
VTI00030  
VTI00040  
VTI00050  
VTI00060  
VTI00070  
VTI00080  
VTI00090  
VTI00100  
VTI00110  
VTI00120  
VTI00130  
VTI00140  
VTI00150  
VTI00160  
VTI00170



FILE: VERTTELE DATA

A1 MIDWEST S+E COMPUTER CENTER

GENERATE A PLCT.

FRAME.

Y AXIS MIN 0.0, MAX 1.0, STEP 0.1

X GRID CN.

Y GRID CN.

Y AXIS LABEL IS 'PRCEABILITY CF COMPLETION',  
LENGTH 8.

X AXIS LENGTH 10.

X AXIS COLOR IS YELLOW.

Y AXIS COLOR IS YELLOW.

TITLE COLOR IS YELLOW.

X PAGE 14.

Y PAGE 11.

Y ORIGIN 1 .

X ORIGIN 2 .

CURVE 1 THICKNESS 3.

CURVE 1 SYMBOL COUNT 0.

LEGEND UNITS COORDINATE.

LEGEND X ORIGIN 4, Y ORIGIN 4940 .

BANKDATA.

EOD.

GO.

\*\*FILE\*\*

FILE: VERTTELW DATA      W1 MIDWEST S+E COMPUTER CENTER

GENERATE A PLOT.  
FRAME.  
Y AXIS MIN 0.0, MAX 1.0, STEP 0.1  
X GRID ON.  
Y GRID ON.  
Y AXIS LABEL IS 'PROBABILITY OF COMPLETION',  
LENGTH 8.  
X AXIS LENGTH 10.  
X AXIS COLOR IS YELLOW.  
Y AXIS COLOR IS YELLOW.  
TITLE COLOR IS YELLOW.  
X PAGE 14.  
Y PAGE 11.  
Y ORIGIN 1 .  
X ORIGIN 2 .  
CURVE 1 THICKNESS 3.  
CURVE 1 SYMBOL COUNT 0.  
LEGEND UNITS COORDINATE.  
LEGEND X ORIGIN 4, Y ORIGIN 4940 .  
BANKDATA.  
ECD.  
GL.  
\*\*FILE\*\*

FILE: VERTGRF2 EXEC      A1    MIDWEST S+E COMPUTER CENTER

&CONTROL CFF  
&BEGTYPE

NOTE: TO BE CONSISTENT YOU SHOULD USE VG AS THE FIRST TWO LETTERS  
OF THE FILENAME. HOWEVER, IT IS NOT MANDATORY THAT YOU DO SO.

&END  
&TYPE  
&TYPE ENTER THE FILENAME FOR THE VERT GRAPH FILE TO BE CREATED  
&READ ARGS  
EDIT &1 DATA A1

FILE: VERTGRF3 EXEC

A1 MIDWEST S+E COMPUTER CENTER

&CONTROL OFF

&TYPE

&TYPE ENTER FILENAME OF THE GRAPH FILE TO BE EDITED

&READ ARGS

EDIT &1 DATA A1

FILE: VERTGRF4 EXEC

A1 MIDWEST S+E COMPUTER CENTER

&CONTROL OFF

&TYPE

&TYPE ARE YOU USING A 4027 COLOR GRAPHICS TERMINAL ? ENTER YES/NO

&READ ARGS

&IF &1 = YES &GOTO -COLOR

CCPY TAGPRO 4014 A1 TAGPRC DATA A1 (REPLACE

&GOTO -NEXT

-COLOR

COPY TAGPRO 4027 A1 TAGPRC DATA A1 (REPLACE

-NEXT

&TYPE

&TYPE ENTER THE FILENAME OF THE GRAPH FILE TO BE VIEWED

&READ ARGS

EX TELEGRAF &1 (XEQ

FILE: VERTGRF5 EXEC

A1 MIDWEST S+E COMPUTER CENTER

&CCNTRCL OFF

&TYPE

&TYPE ARE YOU USING A 4027 COLOR GRAPHICS TERMINAL ? ENTER YES/NO

&READ ARGS

&IF &1 = YES &GOTC -COLOR

COPY TAGPRO 4014 A1 TAGPRC DATA A1 (REPLACE

&GOTO -NEXT

-COLOR

COPY TAGPRO 4027 A1 TAGPRO DATA A1 (REPLACE

-NEXT

EX FPRESENT VERTGF5A

EX FPRESENT VERTGF5B

EX PRESENT VERTGF5C



GENERATE A PLCT.

FRAME.

Y AXIS MIN 0.0, MAX 1.0, STEP 0.1

X GRID CN.

Y GRID CN.

Y AXIS LABEL IS 'PROBABILITY OF COMPLETION',  
LENGTH 8.

X AXIS LENGTH 10.

X AXIS LABEL IS 'SCHEDULE IN MONTHS'.

TITLE IS 'FACTS/ITMS SCLC SOURCE'.

X AXIS COLOR IS YELLOW.

Y AXIS COLOR IS YELLOW.

TITLE COLOR IS YELLOW.

X PAGE 14.

Y PAGE 11.

Y ORIGIN 1 .

X ORIGIN 2 .

INPUT DATA.

|            |            |            |            |            |            |
|------------|------------|------------|------------|------------|------------|
| 32.84,0.00 | 33.25,.004 | 33.66,.006 | 34.06,.013 | 34.47,.036 | 34.88,.064 |
| 35.29,.113 | 35.69,.177 | 36.10,.268 | 36.51,.355 | 36.92,.458 | 37.33,.564 |
| 37.73,.669 | 38.14,.758 | 38.55,.829 | 38.96,.890 | 39.37,.931 | 39.77,.963 |
| 40.18,.982 | 40.59,.989 | 41.00,.995 | 41.41,.999 | 41.81,1.0  |            |

EOD.

CURVE 1 THICKNESS 3.

CURVE 1 SYMBOL COUNT 0.

LEGEND UNITS COORDINATE.

LEGEND X ORIGIN 4, Y ORIGIN 4940 .

GO.

GENERATE A PLCT.

FRAME.

Y AXIS MIN 0.0, MAX 1.0, STEP 0.1

X GRID CN.

Y GRID CN.

Y AXIS LABEL IS 'PROBABILITY OF COMPLETION',  
LENGTH 8.

X AXIS LENGTH 10.

X AXIS LABEL IS 'COST IN MILLIONS'.

TITLE IS 'FACTS/ITMS SOLE SOURCE'.

X AXIS COLOR IS YELLOW.

Y AXIS COLOR IS YELLOW.

TITLE COLOR IS YELLOW.

X PAGE 14.

Y PAGE 11.

Y ORIGIN 1 .

X ORIGIN 2 .

INPUT DATA.

|       |       |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 28.96 | ,.0   | 29.2  | ,.011 | 29.43 | ,.02  | 29.67 | ,.058 | 29.91 | ,.106 | 30.15 | ,.161 |
| 30.39 | ,.244 | 30.63 | ,.336 | 30.87 | ,.43  | 31.11 | ,.534 | 31.34 | ,.614 | 31.58 | ,.687 |
| 31.82 | ,.746 | 32.06 | ,.812 | 32.3  | ,.857 | 32.54 | ,.898 | 32.78 | ,.927 | 33.02 | ,.96  |
| 33.26 | ,.979 | 33.49 | ,.993 | 33.73 | ,.999 | 33.97 | ,.999 | 34.21 | ,1.0  |       |       |

END.

CURVE 1 THICKNESS 3.

CURVE 1 SYMBOL COUNT 0.

LEGEND UNITS COORDINATE.

LEGEND X ORIGIN 4, Y ORIGIN 4940 .

GO.

GENERATE A PLCT.

FRAME.

Y AXIS MIN 0.0, MAX 1.0, STEP 0.1

X GRID CN.

Y GRID CN.

Y AXIS LABEL IS 'PROBABILITY OF COMPLETION',  
LENGTH 9.

X AXIS LENGTH 10.

X AXIS LABEL IS 'PERFORMANCE WEIGHT IN POUNDS'.

TITLE IS 'FACTS/ITMS SOLE SOURCE'.

X AXIS COLOR IS YELLOW.

Y AXIS COLOR IS YELLOW.

TITLE COLOR IS YELLOW.

X PAGE 14.

Y PAGE 11.

Y ORIGIN 1 .

X ORIGIN 2 .

INPUT DATA.

61.60,.000 62.19,.011 62.77,.031 63.36,.061 63.94,.116 64.53,.179

65.12,.242 65.70,.320 66.29,.401 66.87,.502 67.46,.594 68.04,.671

68.63,.751 69.21,.812 69.80,.865 70.38,.905 70.97,.937 71.55,.964

72.14,.984 72.73,.995 73.31,.998 73.90,.998 74.48,1.0

EOD.

CURVE 1 THICKNESS 3.

CURVE 1 SYMBOL COUNT 0.

LEGEND UNITS COORDINATE.

LEGEND X ORIGIN 4, Y ORIGIN 4940 .

GC.

&CONTROL OFF

-INIT

IF &GLOBAL1 = 2 &GOTO -FIN

IF &GLOBAL2 = 2 &GOTO -RET

IF .&1 = .      &GOTO -CONT

IF .&1 = .END &GOTO -FIN

IF .&1 = .R      &GOTO -RET

IF .&1 = .7      &GOTO -END7

IF .&1 = .6      &GOTO -END6

IF .&1 = .5      &GOTO -END5

IF .&1 = .4      &GOTO -END4

IF .&1 = .3      &GOTO -END3

IF .&1 = .2      &GOTO -END2

IF .&1 = .1      &GOTO -END1

-CONT

&BEGTYPE

SECONDARY MENU LEVEL:   ENTER THE OPTION DESIRED :

- 1      =   DISPLAY   A LISTING OF VERT EXECUTIVE PROCEDURES
- 2      =   DISPLAY A LISTING OF VERT SOURCE PROGRAMS
- 3      =   DISPLAY A LISTING OF VERT INPUT DATA FILES
- 4      =   DISPLAY A LISTING OF VERT OUTPUT DATA FILES
- 5      =   DISPLAY A LISTING OF VERT GRAPHICS DATA FILES
- 6      =   DISPLAY A LISTING OF VERT PLOT PREVIEW DATA FILES
- 7      =   GET LISTING MENU FOR EDITING THE ABOVE DATA FILES
- R      =   RETURN TO THE MAIN MENU LEVEL
- END    =   END THE SESSION

&ENDTYPE

&READ ARGS

&GOTO -INIT

-END1

EX VERTIND1

&GOTO -PASS

-END2

EX VERTIND2

&GOTO -PASS

-END3

EX VERTIND3

&GOTO -PASS

-END4

EX VERTIND4

&GOTO -PASS

-END5

EX VERTIND5

&GOTO -PASS

-END6

EX VERTIND6  
&GCTC -PASS  
-END7  
EX VERTIND7  
&GCTL -PASS  
-PASS  
&ARGS  
&GCTL -INIT  
-FIN  
&GLCBALL = 2  
&GCTC -RET  
-RET

FILE: VERTIND1 EXEC      A1    MIDWEST S+E COMPUTER CENTER

&CONTROL OFF

-AGAIN

&DEGTYPE

ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:  
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL  
OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

1 -> TEKTRONIX 4014 GRAPHICS TERMINAL

2 -> AGILE LINE PRINTER

&END

&READ ARGS

&IF .&1 = .1 &TERMTYPE = TEK

&IF .&1 = .2 &TERMTYPE = AGILE

&IF .&1 = .1 &GCTC -CNT

&IF .&1 = .2 &GCTC -CNT

&GCTC -AGAIN

-CNT

EX VERTTERM VERTIND1 DATA A1 22 &TERMTYPE NOF

VERTEX    EXEC A1    -DISPLAYS AND RUNS THE MAIN LEVEL MENU  
 VERTRUN   EXEC A1    -RUNS THE VERT MODULES VERTNEW AND VERTNEW1 ONLINE  
 VERTBAT   EXEC A1    -RUNS THE VERT MODULES VERTNEW AND VERTNEW1 OFFLINE  
 VERTTEST EXEC A1    -DISPLAYS VERT OUTPUT FROM EITHER AN ONLINE OR OFFLINE RUN  
 VERTREAD EXEC A1    -READS THE CONSOLE FILES TO CHECK IF A VERT OFFLINE JOB HAS  
    COMPLETED      <THIS EXEC IS A PART OF THE VERTTEST EXEC>  
 VERTIN    EXEC A1    -RUNS THE VERTINP AND VERTFREE EXECS WHICH ALLOW CREATION  
    OF A FIXED FORM OR FREE FORM VERT INPUT DATA FILE  
 VERTINP   EXEC A1    -ALLWS CREATION OF A FIXED FORM VERT INPUT DATA FILE  
 VERTFREE EXEC A1    -RUNS THE FREE FORM VERT INPUT FILE MODULE (VERTFREE)  
 VERTEDIT EXEC A1    -EDITS EXISTING VERT INPUT DATA FILES  
 VERTPLT   EXEC A1    -DISPLAYS AND RUNS THE SECONDARY LEVEL PLOT MENU  
 VERTPLT1 EXEC A1    -ALLOWS CREATION OF A VERT NETWORK PLOT DATA FILE  
 VERTPLT2 EXEC A1    -EDITS EXISTING VERT NETWORK PLOT DATA FILES  
 VERTPLT3 EXEC A1    -RUNS THE VERTPLOT EXEC FOR DISPLAYING A VERT NETWORK PLOT  
 VERTPLT4 EXEC A1    -DISPLAYS THE SAMPLE VERT NETWORK PLOT  
 VERTPLOT EXEC A1    -RUNS THE VERTPLOT MODULE FOR DISPLAYING A VERT NETWORK PLOT  
 VERTGRAF EXEC A1    -DISPLAYS AND RUNS THE SECONDARY LEVEL GRAPHICS MENU  
 VERTGRF1 EXEC A1    -DISPLAYS VERT GRAPHS USING TELEGRAF BANKDATA FILES  
 VERTGRF2 EXEC A1    -ALLOWS CREATION OF MANUALLY INPUTTED GRAPHICS DATA FILES  
 VERTGRF3 EXEC A1    -EDITS EXISTING MANUALLY CREATED GRAPHICS DATA FILES  
 VERTGRF4 EXEC A1    -DISPLAYS MANUALLY CREATED GRAPHICS DATA FILES  
 VERTGRF5 EXEC A1    -DISPLAYS THE SAMPLE VERT GRAPHS  
 VERTINDX EXEC A1    -DISPLAYS AND RUNS THE SECONDARY LEVEL LIST MENU  
 VERTIND1 EXEC A1    -LISTS THE VERT EXECUTIVE PROCEDURES  
 VERTIND2 EXEC A1    -LISTS THE VERT SOURCE PROGRAMS AND MODULES  
 VERTIND3 EXEC A1    -LISTS THE VERT INPUT DATA FILES  
 VERTIND4 EXEC A1    -LISTS THE VERT OUTPUT DATA FILES  
 VERTIND5 EXEC A1    -LISTS THE VERT GRAPHICS DATA FILES



FILE: VERTIND1 DATA      A1    MIDWEST S+E COMPUTER CENTER

VERTIND6 EXEC A1    -LISTS THE VERT PLCT DATA FILES

VERTIND7 EXEC A1    -DISPLAYS AND RUNS THE TERTIARY LEVEL INDEX UPDATE MENU

VERTTERM EXEC A1    -CONTROLS THE INDEX LISTS TO 22 LINES OF TEXT PER SCREEN

&CONTROL CFF  
-AGAIN  
&DEGTYPE

ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:  
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL  
OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

- 1 -> TEKTRONIX 4014 GRAPHICS TERMINAL
- 2 -> AGILE LINE PRINTER

&END  
&READ ARGS  
&IF .&1 = .1 &TERMTYPE = TEK  
&IF .&1 = .2 &TERMTYPE = AGILE  
&IF .&1 = .1 &GOTO -CENT  
&IF .&1 = .2 &GOTO -CENT  
&GOTO -AGAIN  
-CENT  
EX VERTTERM VERTIND2 DATA A1 22 &TERMTYPE NOF

FILE: VERTIND2 DATA      A1    MIDWEST S+E COMPUTER CENTER

VERTNEW    FORTRAN    A1    -400 NODE, MEAN NODE OPTION, VERSION OF VERT  
VERTNEW    MODULE    A1    -400 NODE, MEAN NODE OPTION, VERT LOAD MODULE  
VERTNEW1   FORTRAN    A1    -VERTNEW WITH TELEGRAF CALL COMMANDS FOR CREATING  
                         TELEGRAF BANKDATA FILES  
VERTNEW1   MODULE    A1    -LOAD MODULE FOR VERTNEW1  
VBANKNAM   FORTRAN    A1    -CREATES THE TITLES FOR THE TELEGRAF BANKDATA FILES  
VEANKNAM   MODULE    A1    -LOAD MODULE FOR VBANKNAM FORTRAN A1  
VTITLE     FORTRAN    A1    -CREATES THE TITLES FOR THE VERTTELE AND VERTTELW  
                         DATA FILES TO BE USED IN DISPLAYING TELEGRAF  
                         BANKDATA FILES  
VTITLE     MODULE    A1    -LOAD MODULE FOR VTITLE FORTRAN A1  
VERTFREE   FORTRAN    A1    -RUNS THE FREE FORM VERT INPUT DATA FILE PROGRAM  
VERTFREE   MODULE    A1    -LOAD MODULE FOR VERTFREE  
VERTPLOT   FORTRAN    A1    -SCURCE PROGRAM FOR PLCTTING VERT NETWORKS  
VERTPLOT   MODULE    A1    -LOAD MODULE FOR VERTPLOT  
VERTBAT    FORTRAN    A1    -CREATES THE VARIABLE RECCRDS FOR VERTNEW BATCH A1  
VERTBAT    MODULE    A1    -LOAD MODULE FOR VERTBAT FORTRAN A1  
VERTBAT1   FORTRAN    A1    -CREATES THE VARIABLE RECCRDS FOR VERTNEW1 BATCH A1  
VERTBAT1   MODULE    A1    -LOAD MODULE FOR VERTBAT1 FORTRAN A1  
VERTNEW    BATCH     A1    -INPUT FILE FOR CMS BATCH USING VERTNEW MODULE A1 OFFLINE  
VERTNEW1   BATCH     A1    -INFLT FILE FOR CMS BATCH USING VERTNEW1 MODULE A1 OFFLINE  
VERTBAT    DATA     A1    -TEMPORARY OUTPUT FILE FOR BOTH VERTBAT AND VERTBAT1

FILE: VERTIND3 EXEC      A1    MIDWEST S+E COMPUTER CENTER

&CONTROL OFF  
-AGAIN  
&DEGTYPE

ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:  
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL  
OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

- 1    ->    TEKTRONIX 4014 GRAPHICS TERMINAL
- 2    ->    AGILE LINE PRINTER

&END  
&READ ARGS  
&IF .&1 = .1 &TERMTYPE = TEK  
&IF .&1 = .2 &TERMTYPE = AGILE  
&IF .&1 = .1 &GLTC -CLNT  
&IF .&1 = .2 &GLTC -CLNT  
&GLTC -AGAIN  
-CLNT  
EX VERTTERM VERTIND3 DATA A1 22 &TERMTYPE NCH

FILE: VERTIND3 DATA A1 MIDWEST S+E COMPUTER CENTER

VIC030P1 DATA A1 -FM CCBRA 30MM CHAIN GUN DRA (TIME, COST & TECH RISK)

VILTUGN1 DATA A1 -PC AWC REVISED NDI LARGE TUG DRA (TIME ONLY)

VILTUGN0 DATA A1 -PC AWC NDI LARGE TUG DRA (TIME ONLY)

|  |       |         |      |       |      |
|--|-------|---------|------|-------|------|
| 1 4                                      | 1     | 435459  | 100  | 1.0   | 1.0  |
| CLBRA-30MM PROGRAM-PROGRAM ALTERNATIVE 1 |       |         |      |       |      |
| 0.0                                      | 6.0   |         |      |       |      |
| 6.0                                      | 12.0  |         |      |       |      |
| 12.0                                     | 18.0  |         |      |       |      |
| 18.0                                     | 24.0  |         |      |       |      |
| 24.0                                     | 30.0  |         |      |       |      |
| 0.0                                      | 30.0  |         |      |       |      |
| ENDCTPR                                  |       |         |      |       |      |
| D1                                       | START | 1       | 1.   |       |      |
| HS2GS                                    | 1     | 18      | 1.   |       |      |
| HS2GS                                    | DTIME | 1 3.    | 5.53 | 8.13  | 6.5  |
| HS2GS                                    | M     | 1 .95   |      |       |      |
| FHS2GS                                   | 1     | FAIL    | 1.   |       |      |
| FHS2GS                                   | M     | 1 .05   |      |       |      |
| M/AG2                                    | 18    | 31      | 1.   |       |      |
| M/AG2                                    | DTIME | 1 3.    | 2.98 | 4.38  | 3.5  |
| D15                                      | 31    | SUCCESS | 1.   |       |      |
| D2                                       | START | 2       | 1.   |       |      |
| BLDG3                                    | 2     | 14      | 1.   |       |      |
| BLDG3                                    | DTIME | 1 3.    | 1.28 | 1.88  | 1.5  |
| BLDG3                                    | DCCST | 1 3.    | .312 | .634  | .519 |
| BLDG3                                    | M     | 1 .98   |      |       |      |
| FBLDG3                                   | 2     | FAIL    | 1.   |       |      |
| FBLDG3                                   | M     | 1 .02   |      |       |      |
| HSG3                                     | 14    | 19      | 1.   |       |      |
| HSG3                                     | DTIME | 1 3.    | 6.38 | 9.38  | 7.5  |
| HSG3                                     | DCCST | 1 3.    | .312 | .634  | .519 |
| HSG3                                     | M     | 1 .995  |      |       |      |
| FHSG3                                    | 14    | FAIL    | 1.   |       |      |
| FHSG3                                    | M     | 1 .005  |      |       |      |
| TST/MG3                                  | 19    | 32      | 1.   |       |      |
| TST/MG3                                  | DTIME | 1 3.    | 5.95 | 8.75  | 7.0  |
| TST/MG3                                  | DCCST | 1 3.    | .312 | .634  | .519 |
| TST/MG3                                  | M     | 1 .995  |      |       |      |
| FTST/MG3                                 | 19    | FAIL    | 1.   |       |      |
| FTST/MG3                                 | M     | 1 .005  |      |       |      |
| D16                                      | 32    | SUCCESS | 1.   |       |      |
| D3                                       | START | 3       | 1.   |       |      |
| BLDG4                                    | 3     | 22      | 1.   |       |      |
| BLDG4                                    | DTIME | 1 3.    | 9.35 | 13.75 | 11.0 |
| BLDG4                                    | DCCST | 1 3.    | .346 | .721  | .597 |
| BLDG4                                    | M     | 1 .985  |      |       |      |
| FBLDG4                                   | 3     | FAIL    | 1.   |       |      |
| FBLDG4                                   | M     | 1 .015  |      |       |      |
| D14                                      | 18    | 22      | 1.   |       |      |
| SG4TCGE                                  | 22    | 24      | 1.   |       |      |
| SG4TCGE                                  | DTIME | 1 3.    | .43  | .63   | .5   |
| D4                                       | START | 4       | 1.   |       |      |
| BLDG5                                    | 4     | 15      | 1.   |       |      |
| BLDG5                                    | DTIME | 1 3.    | 3.4  | 5.    | 4.0  |
| BLDG5                                    | DCCST | 1 3.    | .346 | .731  | .597 |
| BLDG5                                    | M     | 1 .985  |      |       |      |
| FBLDG5                                   | 4     | FAIL    | 1.   |       |      |
| FBLDG5                                   | M     | 1 .015  |      |       |      |

|            |       |         |       |       |       |
|------------|-------|---------|-------|-------|-------|
| TSTG5      | 15    | 20      | 1.    |       |       |
| TSTG5      | DTIME | 1 3.    | 1.42  | 2.09  | 1.67  |
| TSTG5      | DCLST | 1 3.    | .346  | .731  | .597  |
| TSTG5      | M     | 1 .99   |       |       |       |
| FTSTG5     | 15    | FAIL    | 1.    |       |       |
| FTSTG5     | M     | 1 .01   |       |       |       |
| D6         | START | 6       | 1.    |       |       |
| BLDT1      | 6     | 16      | 1.    |       |       |
| BLDT1      | DTIME | 1 3.    | 4.42  | 6.5   | 5.2   |
| BLDT1      | DCCST | 1 3.    | .244  | .392  | .319  |
| BLDT1      | M     | 1 1.0   |       |       |       |
| FBLDT1     | 6     | FAIL    | 1.    |       |       |
| FBLDT1     | M     | 1 0.0   |       |       |       |
| STITCH     | 16    | 20      | 1.    |       |       |
| STITCH     | DTIME | 1 3.    | .43   | .63   | .5    |
| TSTG5T1    | 20    | 33      | 1.    |       |       |
| TSTG5T1    | DTIME | 1 3.    | 8.78  | 12.91 | 10.33 |
| TSTG5T1    | DCCST | 1 3.    | .346  | .731  | .597  |
| TSTG5T1    | M     | 1 .98   |       |       |       |
| FTSTG5T120 |       | FAIL    | 1.    |       |       |
| FTSTG5T1M  |       | 1 .02   |       |       |       |
| D17        | 33    | SUCCESS | 1.    |       |       |
| D5         | START | 5       | 1.    |       |       |
| BLD3GS     | 5     | 23      | 1.    |       |       |
| BLD3GS     | DTIME | 1 3.    | 9.35  | 13.75 | 11.0  |
| BLD3GS     | DCCST | 1 3.    | 1.038 | 2.193 | 1.790 |
| BLD3GS     | M     | 1 .995  |       |       |       |
| FBLD3GS    | 5     | FAIL    | 1.    |       |       |
| FBLD3GS    | M     | 1 .005  |       |       |       |
| SG8TCB     | 23    | 35      | 1.    |       |       |
| SG8TCB     | DTIME | 1 3.    | .43   | .63   | .5    |
| D19        | 35    | SUCCESS | 1.    |       |       |
| D7         | START | 7       | 1.    |       |       |
| SG6TCB     | 23    | 27      | 1.    |       |       |
| SG6TCB     | DTIME | 1 3.    | .43   | .63   | .5    |
| SG7TCB     | 23    | 28      | 1.    |       |       |
| SG7TCB     | DTIME | 1 3.    | .43   | .63   | .5    |
| BLDT2      | 7     | 24      | 1.    |       |       |
| BLDT2      | DTIME | 1 3.    | 5.95  | 8.75  | 7.0   |
| BLDT2      | DCCST | 1 3.    | .244  | .392  | .319  |
| BLDT2      | M     | 1 1.0   |       |       |       |
| FBLDT2     | 7     | FAIL    | 1.    |       |       |
| FBLDT2     | M     | 1 0.0   |       |       |       |
| TSTG4T2    | 24    | 34      | 1.    |       |       |
| TSTG4T2    | DTIME | 1 3.    | 5.1   | 7.5   | 6.0   |
| TSTG4T2    | DCCST | 1 3.    | .244  | .392  | .319  |
| TSTG4T2    | M     | 1 .98   |       |       |       |
| FTSTG4T224 |       | FAIL    | 1.    |       |       |
| FTSTG4T2M  |       | 1 .02   |       |       |       |
| D18        | 34    | SUCCESS | 1.    |       |       |
| D8         | START | 8       | 1.    |       |       |
| BLDT3      | 8     | 25      | 1.    |       |       |
| BLDT3      | DTIME | 1 3.    | 7.65  | 11.25 | 9.0   |
| BLDT3      | DCCST | 1 3.    | .244  | .392  | .319  |
| BLDT3      | M     | 1 1.0   |       |       |       |



|         |       |         |      |       |       |
|---------|-------|---------|------|-------|-------|
| FBLDT3  | 8     | FAIL    | 1.   |       |       |
| FBLDT3  | M     | 1 0.0   |      |       |       |
| ST3TCB  | 25    | 27      | 1.   |       |       |
| ST3TCB  | DTIME | 1 3.    | .43  | .63   | .5    |
| D9      | START | 9       | 1.   |       |       |
| BLDT4   | 9     | 26      | 1.   |       |       |
| BLDT4   | DTIME | 1 3.    | 7.65 | 11.25 | 9.0   |
| BLDT4   | DCCST | 1 3.    | .244 | .392  | .315  |
| BLDT4   | M     | 1 1.0   |      |       |       |
| FBLDT4  | 9     | FAIL    | 1.   |       |       |
| FBLDT4  | M     | 1 0.0   |      |       |       |
| ST4TCB  | 26    | 28      | 1.   |       |       |
| ST4TCB  | DTIME | 1 3.    | .43  | .63   | .5    |
| D10     | START | 10      | 1.   |       |       |
| ENGP    | 10    | 17      | 1.   |       |       |
| ENGP    | DTIME | 1 3.    | 1.79 | 2.63  | 2.1   |
| ENGP    | DCCST | 1 3.    | .972 | 1.373 | 1.058 |
| ENGP    | M     | 1 1.0   |      |       |       |
| FENGP   | 10    | FAIL    | 1.   |       |       |
| FENGP   | M     | 1 0.0   |      |       |       |
| FBMCDP  | 17    | 21      | 1.   |       |       |
| FBMCDP  | DTIME | 1 3.    | 5.02 | 7.38  | 5.5   |
| FBMCDP  | DCCST | 1 3.    | .972 | 1.373 | 1.058 |
| FBMCDP  | M     | 1 1.0   |      |       |       |
| FFBMCDP | 17    | FAIL    | 1.   |       |       |
| FFBMCDP | M     | 1 0.0   |      |       |       |
| TSTP    | 21    | 36      | 1.   |       |       |
| TSTP    | DTIME | 1 3.    | 7.23 | 10.63 | 8.5   |
| TSTP    | DCCST | 1 3.    | .972 | 1.373 | 1.058 |
| TSTP    | M     | 1 1.0   |      |       |       |
| FTSTP   | 21    | FAIL    | 1.   |       |       |
| FTSTP   | M     | 1 0.0   |      |       |       |
| D20     | 36    | SUCCESS | 1.   |       |       |
| D11     | START | 11      | 1.   |       |       |
| BLDI    | 11    | 27      | 1.   |       |       |
| BLDI    | DTIME | 1 3.    | 10.2 | 15.   | 12.0  |
| BLDI    | DCCST | 1 3.    | .972 | 1.373 | 1.058 |
| BLDI    | M     | 1 1.0   |      |       |       |
| FBLDI   | 11    | FAIL    | 1.   |       |       |
| FBLDI   | M     | 1 0.0   |      |       |       |
| INTI    | 27    | 29      | 1.   |       |       |
| INTI    | DTIME | 1 3.    | 1.23 | 1.88  | 1.5   |
| INTI    | DCCST | 1 3.    | .972 | 1.373 | 1.058 |
| INTI    | M     | 1 1.0   |      |       |       |
| FINTI   | 27    | FAIL    | 1.   |       |       |
| FINTI   | M     | 1 0.0   |      |       |       |
| TSTI    | 29    | 37      | 1.   |       |       |
| TSTI    | DTIME | 1 3.    | 2.98 | 4.38  | 3.5   |
| TSTI    | DCCST | 1 3.    | .972 | 1.373 | 1.058 |
| TSTI    | M     | 1 .95   |      |       |       |
| FTSTI   | 29    | FAIL    | 1.   |       |       |
| FTSTI   | M     | 1 .05   |      |       |       |
| D21     | 37    | SUCCESS | 1.   |       |       |
| D12     | START | 12      | 1.   |       |       |
| BLDC    | 12    | 28      | 1.   |       |       |

|       |       |   |         |       |       |       |
|-------|-------|---|---------|-------|-------|-------|
| BLDQ  | DTIME | 1 | 3.      | 14.88 | 21.88 | 17.5  |
| BLDQ  | DCCST | 1 | 3.      | .972  | 1.373 | 1.058 |
| BLDQ  | M     | 1 | 1.0     |       |       |       |
| FBLDQ | 12    |   | FAIL    | 1.    |       |       |
| FBLDQ | M     | 1 | 0.0     |       |       |       |
| INTQ  | 28    |   | 30      | 1.    |       |       |
| INTQ  | DTIME | 1 | 3.      | .43   | .63   | .5    |
| INTQ  | DCCST | 1 | 3.      | .972  | 1.373 | 1.058 |
| INTQ  | M     | 1 | 1.0     |       |       |       |
| FINTQ | 28    |   | FAIL    | 1.    |       |       |
| FINTQ | M     | 1 | 0.0     |       |       |       |
| TSTQ  | 30    |   | 38      | 1.    |       |       |
| TSTQ  | DTIME | 1 | 3.      | 4.25  | 6.25  | 5.0   |
| TSTQ  | DCCST | 1 | 3.      | .972  | 1.373 | 1.058 |
| TSTQ  | M     | 1 | .97     |       |       |       |
| FTSTQ | 30    |   | FAIL    | 1.    |       |       |
| FTSTQ | M     | 1 | .03     |       |       |       |
| D22   | 38    |   | SUCCESS | 1.    |       |       |

ENDARC

|       |   |       |
|-------|---|-------|
| START | 1 | 2     |
| 1     | 2 | 3     |
| 2     | 2 | 3     |
| 3     | 2 | 3     |
| 4     | 2 | 3     |
| 5     | 2 | 3     |
| 6     | 2 | 3     |
| 7     | 2 | 3     |
| 8     | 2 | 3     |
| 9     | 2 | 3     |
| 10    | 2 | 3     |
| 11    | 2 | 3     |
| 12    | 2 | 3     |
| 14    | 2 | 3     |
| 15    | 2 | 3     |
| 16    | 2 | 2     |
| 17    | 2 | 3     |
| 18    | 2 | 2     |
| 19    | 2 | 3     |
| 20    | 2 | 3     |
| 21    | 2 | 3     |
| 22    | 4 | 2     |
| 23    | 2 | 2     |
| 24    | 2 | 3     |
| 25    | 2 | 2     |
| 26    | 2 | 2     |
| 27    | 2 | 3     |
| 28    | 2 | 3     |
| 29    | 2 | 3     |
| 30    | 2 | 316 1 |
| 31    | 2 | 2     |
| 32    | 2 | 2     |
| 33    | 2 | 2     |
| 34    | 2 | 2     |
| 35    | 2 | 2     |
| 36    | 2 | 2     |

FILE: VICE30P1 DATA

A1 MIDWEST S+E COMPUTER CENTER

|          |   |     |
|----------|---|-----|
| 37       | 2 | 2   |
| 38       | 2 | 2   |
| SUCCESS  | 2 | 116 |
| FAIL     | 4 | 11  |
| ENDUNLDE |   |     |

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1 4 1 1 435459 1000 1. 1.
AWC DKA REVISED NDI LARGE TUC PROGRAM
0.0 6.0
6.0 12.0
12.0 18.0
18.0 24.0
24.0 30.0
0.0 30.0
ENDCTPR
PRSTRCC START APPFCC 1.00 PREPARE AND STAFF RUC - TRADOC
PRSTRCC DTIME 1 3 150.0 320.0 180.0
LOGKCC START APPFCC 1.00 COORDINATE AND ESTAB LOG RQMTS - TSARCCM
LOGKCC DTIME 1 3 150.0 180.0 170.0
IEPTCCMAFFCC NLIWCI 1.00 PREPARE IEP - TECOM
IEPTCCMDTIME 1 3 30.0 120.0 60.0
IEPTRADCAFFCC NLIWCI 1.00 PREPARE IEP - TRADOC
IEPTRADCDTIME 1 3 30.0 90.0 60.0
MKTSVY NDIWCI CCML-MS 1.00 CONDUCT MARKET SURVEY AND PREPARE
MKTSVY DTIME 1 3 30.0 60.0 45.0
USERSVY CCML-MSCCML-US 1.00 CONDUCT USER SURVEY AND PREPARE REPORT
USERSVY DTIME 1 3 30.0 60.0 45.0
PREPRPT CCML-USCCMLRPT 1.00 PREPARE AND COMPLETE MKI/USER SURVEY RESULTS REPORT
PREPRPT DTIME 1 3 60.0 120.0 90.0
EVALLOG CCMLRPTFFEIFR 1.00 EVALUATE LOGISTICS CONSIDERATIONS
EVALLOG DTIME 1 3 15.0 60.0 30.0
IERTECCMLRPTFFEIFR 1.00 PREPARE IEP - TECOM
IERTECCMDTIME 1 3 15.0 60.0 40.0
IERTRADCCMLRPTFFEIFR 1.00 PREPARE IEP - TRADOC
IERTRADCDTIME 1 3 15.0 120.0 60.0
PPGCFRI AFFRCC PREIFR 1.00 PREPARE PROVISIONAL QCPRI
PPGCFRI DTIME 1 3 10.0 45.0 24.0
DRAFTMPPAFFRCC PREIFR 1.00 PREPARE DRAFT ACQUISITION PLAN
DRAFTMPPDIME 1 3 90.0 210.0 120.0
DRAFTMACAFFRCC PREIFR 1.00 PREPARE DRAFT MACI PROGRAM PLAN
DRAFTMACDIME 1 3 45.0 120.0 60.0
C&ECHARTAFFRCC C&EEST 1.00 C&E EVALUATION TEAM CHARTERED
C&ECHARTDIME 1 3 30.0 120.0 60.0
CEEVALPLCC&EEST INITCESY 1.00 COMPLETE COMMUNICATION ELECTRONICS EVALUATION PLAN
CEEVALPLDIME 1 3 5.0 30.0 10.0
C&ESVY INITCESYCCML-CE 1.00 PERFORM C&E EVALUATION SURVEY
C&ESVY DTIME 1 3 60.0 120.0 90.0
C&ERPT CCML-CESTARTNDI 1.00 PREPARE AND COMPLETE C&E SURVEY REPORT
C&ERPT DTIME 1 3 15.0 60.0 30.0
R&DPRCG MADP-I STARTR&D 1.00 PREPARE FOR R&D PROGRAM
R&DPRCG DTIME 1 1 30.0
R&DPRCG MTIME 1 0.05
MACIPRCGMADP-I STARTMACI 1.00 PREPARE FOR MACI PROGRAM
MACIPRCGDIME 1 1 30.0
MACIPRCGMTIME 1 0.05
NDIDECSNMADP-I STARTNDI 1.00 APPROVE NDI DECISION
NDIDECSNDIME 1 3 15.0 45.0 30.0
NDIDECSNMTIME 1 0.90
IPRPKG PREIFR MADP-I 1.00 PREPARE AND STAFF IPR PACKAGE
IPRPKG DTIME 1 3 45.0 90.0 60.0
PREPPPD STARTNDIPFINPUT 1.00 PREPARE FUNCTIONAL PURCHASE DESCRIPTION

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B15

B15

B15

|                              |      |  |        |        |
|------------------------------|------|--|--------|--------|
| PREPPD DTIME 1               | 3    | 90.0   | 210.0  | 150.0  |
| PREPLDR STARTNDIFFINPUT      | 1.00 | PREPARE LOGISTICS DATA REQUIREMENTS              |        |        |
| PREPLDR DTIME 1              | 3    | 60.0   | 90.0   | 70.0   |
| DRAFTFFKFFINPUT MACP-II      | 1.00 | PREPARE CRAFT PROCUREMENT PACKAGE                |        |        |
| DRAFTPPKDDTIME 1             | 3    | 30.0   | 60.0   | 45.0   |
| DKFTMPL STARTNDIMACP-II      | 1.00 | PREPARE INITIAL CRAFT MATERIEL PLAN              |        |        |
| DKFTMPL DTIME 1              | 3    | 50.0   | 80.0   | 60.0   |
| UPDIKTESTARTNDIMACP-II       | 1.00 | UPDATE IER - TECOM                               |        |        |
| UPDIERTEDTIME 1              | 3    | 30.0   | 90.0   | 60.0   |
| UPDIERTSTARTNDIMACP-II       | 1.00 | UPDATE IER - TRACOC                              |        |        |
| UPDIERTDDTIME 1              | 3    | 30.0   | 120.0  | 90.0   |
| PREPAPP STARTNDIAFINPUT      | 1.00 | PREPARE ADVANCE PROCUREMENT PLAN                 |        |        |
| PREPAPP DTIME 1              | 3    | 90.0   | 150.0  | 120.0  |
| FINNETPLSTARTNDIAFINPUT      | 1.00 | FINALIZE NET PLAN                                |        |        |
| FINNETPLDIME 1               | 3    | 30.0   | 90.0   | 60.0   |
| DEFMNTPLSTARTNDIAFINPUT      | 1.00 | FINALIZE DEFCT/CONTR MAINT SUPPORT PLAN          |        |        |
| DEFMNTPLDIME 1               | 3    | 45.0   | 90.0   | 60.0   |
| FINPRCVPSTARTNDIAFINPUT      | 1.00 | FINALIZE PROVISIONING PLAN                       |        |        |
| FINPRCVPDIME 1               | 3    | 60.0   | 120.0  | 90.0   |
| FINCCPRISTARTNDIMACP-II      | 1.00 | UPDATE AND FINALIZE QCPRI                        |        |        |
| FINCCPRIDIME 1               | 3    | 60.0   | 180.0  | 120.0  |
| FINAL-AFAFINPUT MACP-II      | 1.00 | FINALIZE AP                                      |        |        |
| FINAL-APDIME 1               | 3    | 30.0   | 60.0   | 45.0   |
| DRAFTMFFMACP-II MFFDRAFT     | 1.00 | PREPARE CRAFT MATERIEL FIELDING PLAN             |        |        |
| DRAFTMFFDIME 1               | 3    | 50.0   | 80.0   | 60.0   |
| ESTBNETTMACP-II EST-NETT     | 1.00 | ESTABLISH NETT                                   |        |        |
| ESTBNETTDIME 1               | 3    | 120.0  | 180.0  | 140.0  |
| FINPPK MACP-II ISSUERFF      | 1.00 | FINALIZE PROCUREMENT PACKAGE                     |        |        |
| FINPPK DTIME 1               | 3    | 120.0  | 210.0  | 180.0  |
| PREPPSLSISSUERFFRECFFSLS     | 1.00 | PREPARE PROPOSALS                                |        |        |
| PREPPSLSDIME 1               | 3    | 30.0   | 90.0   | 60.0   |
| EVAL-FFPRECPPLSINIT-NEG      | 1.00 | EVALUATE HARDWARE/SOFTWARE PROPOSALS             |        |        |
| EVAL-FFPDIME 1               | 3    | 30.0   | 90.0   | 60.0   |
| NEG-FFP INIT-NECCCMFLNEG     | 1.00 | COMPLETE FIRM FIXED PRICE CONTRACT NEGOTIATIONS  |        |        |
| NEG-FFP DTIME 1              | 3    | 24.0   | 40.0   | 30.0   |
| PREAWDSYCCMFLNEGSVYCCMFL     | 1.00 | COMPLETE PRE-AWARD SURVEY FFP CONTRACT           |        |        |
| PREAWDSYDIME 1               | 3    | 24.0   | 60.0   | 30.0   |
| PRCD-AWDSVYCCMFLAWCPFC       | 1.00 | AWARD PRODUCTION FIRM FIXED PRICE (FFP) CONTRACT |        |        |
| PRCD-AWDDIME 1               | 3    | 24.0   | 45.0   | 30.0   |
| EVAL-BCASVYCCMFLAWC-ECA      | 1.00 | EVALUATE EOA PROPOSALS                           |        |        |
| EVAL-BCADIME 1               | 3    | 30.0   | 60.0   | 45.0   |
| EVAL-CLSSVYCCMFLAWC-CLS      | 1.00 | EVALUATE CLS PROPOSALS                           |        |        |
| EVAL-CLSDIME 1               | 3    | 30.0   | 60.0   | 45.0   |
| CCMPLTMSAWCPFC DUMY1         | 1.00 | PREPARE COMMERCIAL IMS                           |        |        |
| CCMPLTMSDIME 1               | 3    | 120.0  | 210.0  | 160.0  |
| FABCRF1 AWCPFC DELCFF1       | 1.00 | FABRICATE FIRST CRAFT                            |        |        |
| FABCRF1 DTIME 1              | 3    | 270.0  | 540.0  | 420.0  |
| PROVISAGAWCPFC FULL-REL      | 1.00 | ACCOMPLISH FULL PROVISIONING                     |        |        |
| PROVISAGDIME 1               | 3    | 720.0  | 1440.0 | 1080.0 |
| ASL/FLL AWCPFC ECA CCMPL-ASL | 1.00 | ESTABLISH ASL/PLL                                |        |        |
| ASL/FLL DTIME 1              | 3    | 85.0   | 120.0  | 90.0   |
| ESTABCLSAWCPFC CLS CLSFAC    | 1.00 | ESTABLISH CLS FACILITY                           |        |        |
| ESTABCLSDIME 1               | 3    | 100.0  | 180.0  | 140.0  |
| CCORDMFFMFFDRAFTMFFCCORD     | 1.00 | COORDINATE MFP                                   |        |        |
| CCORDMFFPDIME 1              | 3    | 90.0   | 120.0  | 90.0   |

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FIN-MFP MFPCCRDMFFCCMPL1.00 PUBLISH MFP
FIN-MFP DTIME 1 3 80.0 120.0 50.0
TRACREWLEST-NETACCP1 1.00 TRAIN INITIAL CREW
TRACREWIDTIME 1 1 10.0
SUPPLTMSDUMMY1 ACPT-TMS1.00 SUPPLEMENT COMMERCIAL MANUALS (VERIFICATION)
SUPPLTMSDTIME 1 3 90.0 180.0 150.0
TMLEAD1 DUMMY1 DELCFF1 1.00S90-DAY TM LEAD TIME
TMLEAD1 DTIME 1 1 90.0
TRIALS DELCFF1 TESTCR1 1.00 CONDUCT DOCK/SEA TRIALS
TRIALS DTIME 1 3 10.0 20.0 15.0
CORRECTNTTESTCR1 ACCPT1 1.00 CORRECT TEST-IDENTIFIED DEFICIENCIES
CORRECTNDTIME 1 3 0.0 90.0 30.0
LTRPTTECTESTCR1 ACCPT1 1.00 PREPARE LETTER REPORT - TECOM
LTRPTTECDTIME 1 3 15.0 50.0 45.0
LTRPTTRATESTCR1 ACCPT1 1.00 PREPARE LETTER REPORT - TRADOC
LTRPTTRADTIME 1 3 30.0 120.0 45.0
ASLLEADTCOMF-ASLACCP1 1.00S20-DAY ASL LEAD TIME
ASLLEADTDTIME 1 1 30.0
CLSLEADTCLSFAC ACCPT1 1.00S30-DAY CLS LEAD TIME
CLSLEADTDTIME 1 1 30.0
TMLEAD2 ACPT-TMSCCND-REL1.00S30-DAY TM LEAD TIME
TMLEAD2 DTIME 1 1 30.0
REL-LEADACCP1 CCND-REL1.00 PREPARE MATERIEL RELEASE PKG - CONDITIONAL
REL-LEADDTIME 1 3 30.0 90.0 45.0
MFP-LEADMFFCCMPLICC 1.00S6-MONTH LEAD TIME
MFP-LEADDTIME 1 1 180.0
ACCPTREMACCP1 FINALDEL1.00 ACCEPT REMAINING CRAFT - QUANTITY DEPENDENT (TWO)
ACCPTRENDTIME 1 3 180.0 240.0 270.0
TAG-TMS ACPT-TMSFULL-REL1.00 PREPARE AUTHENTICATED TAG MANUALS
TAG-TMS DTIME 1 3 120.0 210.0 180.0
USE-BCA COMF-ASLFULL-REL1.00 UTILIZE BGA - DUMMY ACTIVITY
USE-BCA DTIME 1 1 1.0
FRELLEADCCND-RELFULL-REL1.00 PREPARE FULL RELEASE PACKAGE
FRELLEADDTIME 1 3 30.0 50.0 45.0
IOCLEAD2CCND-RELIOCLEAD 1.00SLEAD TIME FROM CCND REL TO IOC - TO FIND SLACK
IOCLEAD2DTIME 1 1 1.0
IOCLEAD1FULL-RELIOCLEAD 1.00SLEAD TIME FROM FULL REL TO IOC - TO FIND SLACK
IOCLEAD1DTIME 1 1 1.0
LEAD-IOCCIOCLEAD IOC 1.00SLOGIC TO PERMIT SHORTEST LEAD TIME FROM FULL/CCNREL
LEAD-IOCDTIME 1 1 1.0
MTSP-FCEACCP1 INIT-FCE1.00 PREPARE MTSP FOR FCE
MTSP-FCEDTIME 1 3 60.0 120.0 70.0
IEP-FCE STARTIEPINIT-FCE1.00 PREPARE IEP FOR FCE - TRADOC
IEP-FCE DTIME 1 3 90.0 180.0 120.0
PERF-FCEINIT-FCECCMFLFCE1.00 PERFORM FCE
PERF-FCEDTIME 1 3 30.0 50.0 45.0
FCE-IER CCNLFCECCMFLIER1.00 PREPARE IER FOR FCE - TRADOC
FCE-IER DTIME 1 3 45.0 50.0 65.0
STAFFIERCCMPLIERCLRCNFI1.00 STAFF INDEPENDENT EVALUATION REPORT (IER)
STAFFIERDTIME 1 3 50.0 50.0 60.0
FLDIHFKKCCCFDCNFFLDGIPR 1.00 STAFF THE FIELDING IPR PACKAGE
FLDIHFKKDTIME 1 3 75.0 120.0 50.0
FLRELDCCFLDGIPR FULL-REL1.00 STAFF THE FULL-RELEASE DOCUMENTATION
FLRELDCCDTIME 1 3 35.0 75.0 35.0
ENDARC

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|           |   |       |  |
|-----------|---|-------|--|
| START     | 1 | 2     | START PROGRAM, ROC AND LOGISTICS RQMTS             |
| APPROC    | 2 | 2     | APPROVE ROC  |
| NDIWG1    | 2 | 2     | CONVENE NDI WORKING GROUP                          |
| CCMPL-MS2 | 2 |       | COMPLETE MARKET SURVEY                             |
| CCMPL-US2 | 2 |       | COMPLETE USER SURVEY                               |
| CCMPLRPT2 | 2 |       | COMPLETE EVALUATION OF FFP CONTRACT PROPOSALS      |
| PREIPR    | 2 | 2     | RECEIVE IPR INPUT, START IPR PACKAGE               |
| MADP-I    | 2 | 3     | CONVENE MADP-I (IPR)                               |
| C&EEST    | 2 | 2     | COMPLETE COMMUNICATIONS & ELECTRONICS (C&E) CHART  |
| INITCESY2 | 2 |       | COMPLETE C&E EVALUATION PLANNING                   |
| CCMPL-CE2 | 2 |       | COMPLETE C&E ACTION FOR C&E REPORT                 |
| START&D2  | 1 |       | COMMENCE R&D PROGRAM                               |
| STARTNDI2 | 2 |       | COMMENCE NDI PROGRAM                               |
| STARTMAC2 | 1 |       | COMMENCE MACI PROGRAM                              |
| PPINPUT   | 2 | 2     | COMPLETE INPUTS TO PROCUREMENT PACKAGE             |
| APINPUT   | 2 | 2     | COMPLETE INPUTS TO ACQUISITION PLAN                |
| MADP-II   | 2 | 2     | CONVENE MADP-II (IPR)                              |
| ISSUERFP2 | 2 |       | ISSUE RFP FOR HARDWARE,CLS BOA                     |
| RECPPLS2  | 2 |       | RECEIVE PROPOSALS FROM PROSPECTIVE SUPPLIERS       |
| INIT-NEG2 | 2 |       | COMPLETE INITIAL NEGOTIATIONS OF FFP CONTRACT      |
| CCMPLNEG2 | 2 |       | COMPLETE FINAL NEGOTIATIONS OF FFP CONTRACT        |
| SVYCCMPL2 | 2 |       | COMPLETE SURVEY OF FFP CONTRACTOR                  |
| AWDPROD   | 2 | 216 1 | AWARD PRODUCTION CONTRACT                          |
| AWD-BLA   | 2 | 2     | AWARD ECA OPTION                                   |
| AWD-CLS   | 2 | 2     | AWARD CLS OPTION                                   |
| DUMMY1    | 2 | 2     | RECEIVE COMMERCIAL TMS                             |
| MFPDRAFT2 | 2 |       | COMPLETE DRAFT MATERIEL FIELDING PLAN              |
| DELORF1   | 2 | 216 2 | DELIVER CRAFT 1                                    |
| EST-NETT2 | 2 |       | NEW EQPT/IKPT ESTABLISHED                          |
| CLSFC     | 2 | 2     | CLS FACILITY COMPLETED                             |
| ACPT-TMS2 | 2 |       | ACCEPT INTERIM MANUALS (VERIFIED & SUPPLEMENTED)   |
| CLMP-ASL2 | 2 |       | COMPLETE ASL/PLL                                   |
| TESTCK1   | 2 | 2     | DOCK/SEA TRIALS COMPLETED                          |
| ACPT1     | 2 | 2     | ACCEPT FIRST CRAFT                                 |
| MFPCCORD2 | 2 |       | COORDINATION OF MFP COMPLETE                       |
| MFPCCMPL2 | 2 |       | MFP CCMPL  |
| CLND-REL2 | 2 |       | CONDITIONAL RELEASE                                |
| STARTIEP1 | 2 |       | TRACOC START IEP FOR FOE                           |
| FULL-REL2 | 2 |       | FULL RELEASE                                       |
| IUCLEAD   | 4 | 2     | DUMMY NODE TO GET TO IUC                           |
| IUC       | 2 | 116   | INITIAL OPERATIONAL CAPABILITY                     |
| FINALDEL2 | 1 |       | FINAL CRAFT DELIVERED                              |
| INIT-FCE2 | 2 |       | INITIATE FCE                                       |
| CCMPLFCE2 | 2 |       | COMPLETE FCE                                       |
| CCMPLIER2 | 2 |       | COMPLETE IER FOR FCE                               |
| CCORDCNF2 | 2 |       | COMPLETE STAFFING OF INDEPENDENT EVALUATION REPORT |
| FLDGIPR   | 2 | 2     | COMPLETE FIELDING IPR PACKAGE FOR FULL RELEASE     |
| ENDNCDE   |   |       |  |



```

1 4    1            435459 1000            1.            1.
AWC DKA NDI LARGE TUG PROGRAM
0.0            6.0
6.0            12.0
12.0           18.0
18.0           24.0
24.0           30.0
30.0           36.0
ENDCTPR
PKSTRCC START    APPRCC    1.00 PREPARE AND STAFF RCC - TRADOC
PKSTRCC DTIME 1            3        150.0        320.0        180.0
LUGRCC START    APPRCC    1.00 COORDINATE AND ESTAB LOG REQTS - TSARCOM
LUGRCC DTIME 1            3        150.0        180.0        170.0
IEPTECCMAFFRCC    NDIWGI    1.00 PREPARE IEP - TECCM
IEPTECCMDTIME 1            3        30.0        120.0        60.0
IEPTRADCAFFRCC    NDIWCI    1.00 PREPARE IEP - TRADOC
IEPTRADCDTIME 1            3        30.0        90.0        60.0
MKTSVY    NDIWGI    CCMPL-MS 1.00 CONDUCT MARKET SURVEY AND PREPARE
MKTSVY DTIME 1            3        30.0        60.0        45.0
USERSVY CCMPL-MS CCMPL-US 1.00 CONDUCT USER SURVEY AND PREPARE REPORT
USERSVY DTIME 1            3        30.0        60.0        45.0
EVALLOG CCMPL-US IERSTART 1.00 EVALUATE LOGISTICS CONSIDERATIONS
EVALLOG DTIME 1            3        15.0        60.0        30.0
IERTECCMCCMPL-US IERSTART 1.00 PREPARE IER - TECCM
IERTECCMDTIME 1            3        15.0        60.0        40.0
IERTRADCCMPL-US IERSTART 1.00 PREPARE IER - TRADOC
IERTRADCDTIME 1            3        15.0        120.0        60.0
PPQCPRI    APPRCC    IPRSTART 1.00 PREPARE PROVISIONAL QCPRI
PPQCPRI DTIME 1            3        10.0        45.0        24.0
DRAFTAP    APPRCC    IPRSTART 1.00 PREPARE DRAFT ACQUISITION PLAN
DRAFTAP DTIME 1            3        90.0        210.0        120.0
R&DPRG    MACP-I    STARTR&D 1.00 PREPARE FOR R&D PROGRAM
R&DPRG DTIME 1            1        30.0
R&DPRG MTIME 1            0.05
MACIFRCGMACP-I    STARTMAC 1.00 PREPARE FOR MACI PROGRAM
MACIFRCGDTIME 1            1        30.0
MACIFRCGMTIME 1            0.05
NDIDECSNACP-I    STARTNDI 1.00 APPROVE NCI DECISION
NDIDECSNDTIME 1            3        15.0        45.0        30.0
NDIDECSNMTIME 1            0.90
IPRPKG    IPRSTARTMACP-I    1.00 PREPARE AND STAFF IPR PACKAGE
IPRPKG DTIME 1            3        45.0        90.0        60.0
PREPFPD    STARTNDIFFINPUT    1.00 PREPARE FUNCTIONAL PURCHASE DESCRIPTION
PREPFPD DTIME 1            3        90.0        210.0        150.0
PREPLDR    STARTNDIPPINPUT    1.00 PREPARE LOGISTICS DATA REQUIREMENTS
PREPLDR DTIME 1            3        60.0        90.0        70.0
DRAFTPPKPFINPUT    MACP-II    1.00 PREPARE DRAFT PROCUREMENT PACKAGE
DRAFTPPKPDTIME 1            3        30.0        60.0        45.0
UPDIERTESTARTNDIMACP-II    1.00 UPDATE IER - TECCM
UPDIERTEDTIME 1            3        30.0        90.0        60.0
UPDIERTESTARTNDIMACP-II    1.00 UPDATE IER - TRADOC
UPDIERTDRTIME 1            3        30.0        120.0        90.0
PREPAPP    STARTNDIAPINPUT    1.00 PREPARE ADVANCE PROCUREMENT PLAN
PREPAPP DTIME 1            3        90.0        150.0        120.0
FINNETPLSTARTNDIAPINPUT    1.00 FINALIZE NET PLAN

```

B15

B15

B15

|                          |      |  |        |        |
|--------------------------|------|--|--------|--------|
| FINNETPLD TIME 1         | 3    | 30.0   | 90.0   | 60.0   |
| DEFMNTPLSTARTNDIAPINPUT  | 1.00 | FINALIZE DEPOT/CONTR MAINT SUPPORT PLAN      |        |        |
| DEFMNTPLD TIME 1         | 3    | 45.0   | 90.0   | 60.0   |
| FINPRCVPSTARTNDIAPINPUT  | 1.00 | FINALIZE PROVISIONING PLAN                   |        |        |
| FINPRCVPD TIME 1         | 3    | 60.0   | 120.0  | 90.0   |
| FINCCPRISTARTNDIACDP-II  | 1.00 | UPDATE AND FINALIZE CCPRI                    |        |        |
| FINCCPRID TIME 1         | 3    | 60.0   | 180.0  | 120.0  |
| FINAL-APAFINPUT MACP-II  | 1.00 | FINALIZE AP                                  |        |        |
| FINAL-APD TIME 1         | 3    | 30.0   | 60.0   | 45.0   |
| DRAFTMFFMACP-II MFFDRAFT | 1.00 | PREPARE CRAFT MATERIEL FIELDING PLAN         |        |        |
| DRAFTMFPD TIME 1         | 3    | 50.0   | 80.0   | 60.0   |
| ESTBNETTMACD-II EST-NETT | 1.00 | ESTABLISH NETT                               |        |        |
| ESTBNETTD TIME 1         | 3    | 120.0  | 180.0  | 140.0  |
| FINPFR MACP-II ISSUERFF  | 1.00 | FINALIZE PROCUREMENT PACKAGE                 |        |        |
| FINPFR D TIME 1          | 3    | 120.0  | 210.0  | 180.0  |
| PREPPSLSISSUERFFRLOPPSLS | 1.00 | PREPARE PROPOSALS                            |        |        |
| PREPPSLSD TIME 1         | 3    | 30.0   | 90.0   | 60.0   |
| EVAL-FFPRECPPSLSAWCPROD  | 1.00 | EVALUATE HARDWARE/SOFTWARE PROPOSALS         |        |        |
| EVAL-FFPD TIME 1         | 3    | 30.0   | 90.0   | 60.0   |
| EVAL-BCAPECPPSLSAWD-ECA  | 1.00 | EVALUATE ECA PROPOSALS                       |        |        |
| EVAL-BCAD TIME 1         | 3    | 30.0   | 60.0   | 45.0   |
| EVAL-CLSFECPPSLSAWD-CLS  | 1.00 | EVALUATE CLS PROPOSALS                       |        |        |
| EVAL-CLSD TIME 1         | 3    | 30.0   | 60.0   | 45.0   |
| COMMLTMSAVLPRCD DUMMY1   | 1.00 | PREPARE COMMERCIAL TMS                       |        |        |
| COMMLTMSD TIME 1         | 3    | 60.0   | 120.0  | 90.0   |
| FABCRF1 AWCPROD DELCRF1  | 1.00 | FABRICATE FIRST CRAFT                        |        |        |
| FABCRF1 D TIME 1         | 3    | 270.0  | 540.0  | 420.0  |
| PROVISNGAWCPROD FULL-REL | 1.00 | ACCOMPLISH FULL PROVISIONING                 |        |        |
| PROVISNGD TIME 1         | 3    | 720.0  | 1440.0 | 1080.0 |
| ASL/FLL AWD-ECA CLMP-ASL | 1.00 | ESTABLISH ASL/PLL                            |        |        |
| ASL/FLL D TIME 1         | 3    | 85.0   | 120.0  | 90.0   |
| ESTABCLSAWD-CLS CLSFAC   | 1.00 | ESTABLISH CLS FACILITY                       |        |        |
| ESTABCLSD TIME 1         | 3    | 100.0  | 180.0  | 140.0  |
| CLCRDMFFMFPDRAFTMFPCCORD | 1.00 | COORDINATE MFP                               |        |        |
| CLCRDMFPD TIME 1         | 3    | 90.0   | 120.0  | 90.0   |
| FIN-MFF MFPCCORDMFPCCMPL | 1.00 | PUBLISH MFP                                  |        |        |
| FIN-MFP D TIME 1         | 3    | 80.0   | 120.0  | 90.0   |
| TRNCREWTEST-NETTACPT1    | 1.00 | TRAIN INITIAL CREW                           |        |        |
| TRNCREWD TIME 1          | 1    | 10.0   |        |        |
| SUPPLTMSDUMMY1 ACPT-TMS  | 1.00 | SUPPLEMENT COMMERCIAL MANUALS (VERIFICATION) |        |        |
| SUPPLTMSD TIME 1         | 3    | 30.0   | 90.0   | 30.0   |
| TMLEAD1 DUMMY1 DELCRF1   | 1.00 | 30-DAY TM LEAD TIME                          |        |        |
| TMLEAD1 D TIME 1         | 1    | 90.0   |        |        |
| TRIALS DELCRF1 TESTCR1   | 1.00 | CONDUCT COCK/SEA TRIALS                      |        |        |
| TRIALS D TIME 1          | 3    | 10.0   | 30.0   | 15.0   |
| CLRCRECTNTTESTCR1 ACCPT1 | 1.00 | CORRECT TEST-IDENTIFIED DEFICIENCIES         |        |        |
| CLRCRECTND TIME 1        | 3    | 0.0  | 90.0   | 30.0   |
| LTRPTTECTESTCR1 ACCPT1   | 1.00 | PREPARE LETTER REPORT - TECOM                |        |        |
| LTRPTTECD TIME 1         | 3    | 15.0   | 90.0   | 45.0   |
| LTRPTTRATESTCR1 ACCPT1   | 1.00 | PREPARE LETTER REPORT - TRADOC               |        |        |
| LTRPTTRAD TIME 1         | 3    | 30.0   | 120.0  | 45.0   |
| ASLLEADTCMP-ASLACCPT1    | 1.00 | 30-DAY ASL LEAD TIME                         |        |        |
| ASLLEADTD TIME 1         | 1    | 30.0   |        |        |
| CLSLLEADTCLSFAC ACCPT1   | 1.00 | 30-DAY CLS LEAD TIME                         |        |        |
| CLSLLEADTD TIME 1        | 1    | 30.0   |        |        |

TMLEAD2 ACPT-TMSCOND-REL1.00S30-DAY TM LEAD TIME

TMLEAD2 DTIME 1 1 30.0

REL-LEADACPT1 COND-REL1.00 PREPARE MATERIEL RELEASE PKG - CONDITIONAL

REL-LEADDTIME 1 3 30.0 90.0 45.0

MFP-LEADMFPCCMPLICC 1.00S6-MONTH LEAD TIME

MFP-LEADDTIME 1 1 100.0

ACPTREMACPT1 FINALDEL1.00 ACCEPT REMAINING CRAFT - QUANTITY DEPENDENT (TWO)

ACPTREMDTIME 1 1 100.0 100.0 170.0

TAG-TMS ACPT-TMFULL-REL1.00 PREPARE AUTHENTICATED TAG MANUALS

TAG-TMS DTIME 1 1 140.0 180.0 120.0

USE-BCA COMF-MFULL-REL1.00 UTILIZE BCA - DUMMY ACTIVITY

USE-BCA DTIME 1 1 1.0

FRELLEACOND-FULLFULL-REL1.00 PREPARE FULL RELEASE PACKAGE

FRELLEADDTIME 1 3 30.0 90.0 45.0

IOCLEAD2COND-RELIOCLEAD 1.00SLEAD TIME FROM COND REL TO IOC - TO FIND SLACK

IOCLEAD2DTIME 1 1 1.0

IOCLEAD1FULL-RELIOCLEAD 1.00SLEAD TIME FROM FULL REL TO IOC - TO FIND SLACK

IOCLEAD1DTIME 1 1 1.0

LEAD-IOCIOCLEAD IOC 1.00SLOGIC TO PERMIT SHORTEST LEAD TIME FROM FULL/CONREL

LEAD-IOC DTIME 1 1 1.0

HTSP-FCEFULL-RELINIT-FCE1.00 PREPARE MISP FOR FCE

HTSP-FCE DTIME 1 3 60.0 120.0 70.0

IEP-FCE STARTIEFINIT-FCE1.00 PREPARE IEP FOR FCE - TRACOC

IEP-FCE DTIME 1 3 90.0 180.0 120.0

PERF-FCEINIT-FCECCMPLFCE1.00 PERFORM FCE

PERF-FCE DTIME 1 3 30.0 90.0 45.0

FCE-IER CCMPLFCECCMPLIER1.00 PREPARE IER FOR FCE - TRACOC

FCE-IER DTIME 1 3 45.0 90.0 65.0

ENDARC

START 1 2

START PROGRAM, RCC AND LOGISTICS RQMTS

APPRCC 2 2 1

APPROVE ROC

NDIWG1 2 2 2

CONVENE NDI WORKING GROUP

CCMPL-MS2 2 3

COMPLETE MARKET SURVEY

CCMPL-US2 2 4

COMPLETE USER SURVEY

IPRSTART2 2 5

RECEIVE IPR INPUT, START IPR PACKAGE

MADP-I 2 3 6

CONVENE MADP-I (IPR)

STARTR&amp;D2 1

COMMENCE R&amp;D PROGRAM

STARTNDI2 2 7

COMMENCE NDI PROGRAM

STARTMAC2 1

COMMENCE MACI PROGRAM

PPINFUT 2 2 8

COMPLETE INPUTS TO PROCUREMENT PACKAGE

APINFUT 2 2 9

COMPLETE INPUTS TO ACQUISITION PLAN

MADP-II 2 2 10

CONVENE MADP-II (IPR)

ISSUERFP2 2 11

ISSUE RFP FOR HARDWARE,CLS BOA

RECPSLS2 2 12

RECEIVE PROPOSALS FROM PROSPECTIVE SUPPLIERS

AWDFRCD 2 2 13

AWARD PRODUCTION CONTRACT

AWD-BLA 2 2 14

AWARD BCA OPTION

AWD-CLS 2 2 15

AWARD CLS OPTION

DUMMY1 2 2 16

RECEIVE COMMERCIAL TMS

MFPDRAFT2 2 17

COMPLETE CRAFT MATERIEL FIELDING PLAN

DELCKR1 2 2 18

DELIVER CRAFT 1

EST-NETT2 2 19

NEW EQPT/IKPT ESTABLISHED

CLSFAC 2 2 20

CLS FACILITY COMPLETED

ACPT-TMS2 2

ACCEPT INTERIM MANUALS (VERIFIED &amp; SUPPLEMENTED)

CCMP-ASL2 2

COMPLETE ASL/PLL

TESTCR1 2 2

DOCK/SEA TRIALS COMPLETED

|           |   |   |                                |
|-----------|---|---|--------------------------------|
| ACCP1     | 2 | 2 | ACCEPT FIRST CRAFT             |
| MFPCCORD2 | 2 |   | COORDINATION OF MFP COMPLETE   |
| MFPCCPL2  | 2 |   | MFP COMPL                      |
| CCND-REL2 | 2 |   | CONDITIONAL RELEASE            |
| STARTIEP1 | 2 |   | TRADOC START IEP FOR FCE       |
| FULL-REL2 | 2 |   | FULL RELEASE                   |
| ICCLEAD 4 | 2 |   | SUMMY NODE TO GET TO IOC       |
| IOC       | 2 | 1 | INITIAL OPERATIONAL CAPABILITY |
| FINALDEL2 | 1 |   | FINAL CRAFT DELIVERED          |
| INIT-FCE2 | 2 |   | INITIATE FCE                   |
| CMPLFCE2  | 2 |   | COMPLETE FCE                   |
| CMPLIER2  | 1 |   | COMPLETE IER FOR FCE           |
| ENDNODE   |   |   |                                |

FILE: VERTIND4 EXEC

A1 MIDWEST S+E COMPUTER CENTER

&CONTROL CFF

-AGAIN

&BEGTYPE

ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:  
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL  
OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

1 -> TEKTRONIX 4014 GRAPHICS TERMINAL

2 -> AGILE LINE PRINTER

&END

&READ ARGS

&IF .&1 = .1 &TERMTYPE = TEK

&IF .&1 = .2 &TERMTYPE = AGILE

&IF .&1 = .1 &GCTC -CCNT

&IF .&1 = .2 &GCTC -CCNT

&GCTC -AGAIN

-CCNT

EX VERTTERM VERTIND4 DATA A1 22 &TERMTYPE NOF

VCUTPUT AAAA A1 -OUTPUT FILE FROM RUNNING A VERT INPUT FILE ONLINE  
(THIS FILE IS CREATED ANEW FOR EACH RUN)

VERT1 AAAA A1 -TEMPCRARY WORKFILE FOR VERT RUN ONLINE

VERT2 AAAA A1 -TEMPCRARY WORKFILE FOR VERT RUN ONLINE

VERT3 AAAA A1 -TEMPCRARY WORKFILE FOR VERT RUN ONLINE

VERT4 AAAA A1 -TEMPCRARY WORKFILE FOR VERT RUN ONLINE

VO&1 DATA W1 -CUTPUT FILES FOR VERT JOBS RUN OFFLINE  
(&1 IS THE SIX MAX ALPHANUMERIC CHARACTER INPUT  
FILENAME ENTERED WHEN A JOB IS RUN OFFLINE)

VERT1 AAAA W1 -TEMPCRARY WORKFILE FOR VERT RUN OFFLINE

VERT2 AAAA W4 -TEMPCRARY WORKFILE FOR VERT RUN OFFLINE

VERT3 AAAA W4 -TEMPCRARY WORKFILE FOR VERT RUN OFFLINE

VERT4 AAAA W4 -TEMPCRARY WORKFILE FOR VERT RUN OFFLINE



FILE: VERTIND5 EXEC      A1    MIDWEST S+E COMPUTER CENTER

&CONTROL OFF

-AGAIN

&BEGTYPE

ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:  
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL  
OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

1    ->    TEKTRONIX 4014 GRAPHICS TERMINAL

2    ->    AGILE LINE PRINTER

&END

&READ ARGS

IF .&1 = .1 &TERMTYPE = TEK

IF .&1 = .2 &TERMTYPE = AGILE

IF .&1 = .1 &GLTC -CENT

IF .&1 = .2 &GLTC -CENT

&GLTC -AGAIN

-CENT

EX VERTTERM VERTIND5 DATA A1 22 &TERMTYPE NOF



FILE: VERTIND5 DATA      A1    MIDWEST S+E COMPUTER CENTER

PRONLINE DATA A1    -TELEGRAF FILE WHICH CONTAINS THE VERT BANKDATA FILES  
                          (THIS FILE IS CREATED ANEW FOR EACH VERT ONLINE RUN)

PR81      DATA W1    -FILES CONTAINING TELEGRAF VERT BANKDATA FILES  
                          ( &1 IS THE SIX MAX ALPHANUMERIC CHARACTER VERT INPUT  
                          FILENAME ENTERED WHEN A VERT OFFLINE RUN IS MADE. THESE  
                          FILES ARE CREATED ANEW FOR EACH OFFLINE RUN SESSION)

TAGPRC     DATA A1    -TELEGRAF HOUSEKEEPING FILE FOR DISPLAYING GRAPHS

TAGPRO     4014 A1    -REPLACES TAGPRO DATA A1 WITH THIS FILE FOR BLACK &  
                          WHITE GRAPHS

TAGPRC     4027 A1    -REPLACES TAGPRC DATA A1 WITH THIS FILE FOR COLOR GRAPHS

TAGTRA     DATA A1    -TELEGRAF OUTPUT FILE CONTAINING A LISTING OF THE TELEGRAF  
                          ACTIONS REQUIRED TO DISPLAY A GRAPH

TEMPORAY DATA A1    -SCRATCH FILE USED BY VERTGRF1 EXEC A1

TEMPORAY DATA W1    -SCRATCH FILE USED BY VERTGRF1 EXEC A1

VBANKNAM DATA A1    -TEMPORARY FILE WHICH HOLDS THE VERT BANKDATA FILENAMES  
                          (THIS FILE IS CREATED ANEW FOR EACH ONLINE RUN)

VBANKNM1 DATA A1    -TEMPORARY FILE WHICH HOLDS THE VERT BANKDATA FILENAMES  
                          (THIS FILE IS CREATED ANEW FOR EACH OFFLINE RUN)

VE81       DATA W1    -TEMPORARY FILES WHICH HOLD VERT BANKDATA FILENAMES  
                          (&1 IS THE SIX MAX ALPHANUMERIC CHARACTER VERT INPUT  
                          FILENAME ENTERED WHEN A VERT OFFLINE RUN SESSION IS  
                          MADE. THESE FILES ARE CREATED ANEW FOR EACH SESSION)

VTITLE     DATA A1    -SCRATCH FILE USED TO HOLD THE GRAPH TITLE AND X AXIS  
                          TITLE FOR EACH GRAPH DISPLAYED VIA AN ONLINE RUN  
                          (THIS FILE IS CREATED ANEW FOR EACH GRAPH DISPLAYED)

VTITLE     DATA W1    -SCRATCH FILE USED TO HOLD THE GRAPH TITLE AND X AXIS  
                          TITLE FOR EACH GRAPH DISPLAYED VIA AN OFFLINE RUN  
                          (THIS FILE IS CREATED ANEW FOR EACH GRAPH DISPLAYED)

VERTTELE DATA A1    -HOLDS THE SKELETAL DATA FOR GENERATING A VERT GRAPH  
                          CREATED FROM A VERT ONLINE RUN

VERTTELW DATA W1    -HOLDS THE SKELETAL DATA FOR GENERATING A VERT GRAPH  
                          CREATED FROM A VERT OFFLINE RUN

VERTGF5A DATA A1    -HOLDS GRAPHICS PRINT VECTORS FOR COBRA FACTS TIME GRAPH

VERTG5A    DATA A1    -DATA FILE FOR THE COBRA FACTS TIME GRAPH

VERTGF5B DATA A1    -HOLDS GRAPHICS PRINT VECTORS FOR COBRA FACTS COST GRAPH

VERTG5B    DATA A1    -DATA FILE FOR THE COBRA FACTS COST GRAPH

FILE: VERTIND5 DATA      A1    MIDWEST S+E COMPUTER CENTER

VERTGF5C DATA A1    -FOLLOWS GRAPHICS PRINT VECTORS FOR COBRA FACTS PERFORMANCE  
GRAPH

VERTG5C    DATA A1    -DATA FILE FOR THE COBRA FACTS PERFORMANCE GRAPH

FILE: VERTIND6 EXEC      A1   MIDWEST S+E COMPUTER CENTER

&CONTROL OFF  
-AGAIN  
&BEGTYPE

ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:  
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL  
OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

1   ->   TEKTRONIX 4014 GRAPHICS TERMINAL

2   ->   AGILE LINE PRINTER

&END  
&READ ARGS  
&IF .&1 = .1 &TERMTYPE = TEK  
&IF .&1 = .2 &TERMTYPE = AGILE  
&IF .&1 = .1 &GCTC -CCNT  
&IF .&1 = .2 &GCTC -CCNT  
&GCTC -AGAIN  
-CCNT  
EX VERTTERM VERTIND6 DATA A1 22 &TERMTYPE NOF

FILE: VERTIND6 DATA      A1    MIDWEST S+E COMPUTER CENTER

TEMPB      DATA T1    -TEMPORARY WORKFILE USED BY VERTPLOT EXEC A1

TEMPFCT    DATA T1    -TEMPORARY WORKFILE USED BY VERTPLOT EXEC A1

VPECFT2R   DATA A1    -DATA FILE FOR PLOTTING THE TPCUP SUPPORT LEVEL II  
MANAGED ROUTINE ECP PHASE I PROCESS

VPLTUGN1   DATA A1    -DATA FILE FOR PLOTTING THE PO AWC LARGE TLG NETWORK

## LARGE TUG ACQUISITION PROGRAM

0.60 1

|          |     |      |     |   |  |
|----------|-----|------|-----|---|--|
| NUDE0.   | 4.5 | 1.   | 2.  | 1 | 2PROJECT INITIATED                     |
| ARC 1.   | 6.  | 5.5  | 6.  | 0 | OPRSTROC 150-180-320 DAYS              |
| ARC 1.   | 5.7 | 5.5  | 5.7 | 0 | 1PREPARE AND STAFF ROC - TRADOC        |
| ARC 1.   | 5.  | 5.5  | 5.  | 0 | OLCCRCO 150-170-180 DAYS               |
| ARC 1.   | 4.7 | 5.5  | 4.7 | 0 | 1CCGRD & ESTAB LCG RQMIS - TSARCOM     |
| NUDE5.5  | 2.5 | 1.   | 6.  | 2 | 2CA RCC APPROVED                       |
| ARC 6.5  | 8.  | 11.  | 8.  | 0 | 01EPTCCM 30-60-120 DAYS                |
| ARC 6.5  | 7.7 | 11.  | 7.7 | 0 | 1PREPARE IEP - IECCM                   |
| ARC 6.5  | 7.  | 11.  | 7.  | 0 | 01EPTRACC 30-60-90 DAYS                |
| ARC 6.5  | 6.7 | 11.  | 6.7 | 0 | 1PREPARE IEP - TRADOC                  |
| ARC 6.5  | 6.  | 33.  | 6.  | 0 | OPPCQPRI 10-24-45 DAYS                 |
| ARC 6.5  | 5.7 | 11.  | 5.7 | 0 | 1PREPARE PROVISIONAL QQPRI             |
| ARC 6.5  | 5.  | 33.  | 5.  | 0 | OCRAFTMP 90-120-210 DAYS               |
| ARC 6.5  | 4.7 | 11.  | 4.7 | 0 | 1PREPARE CRAFT ACQUISITION PLAN        |
| ARC 6.5  | 4.  | 33.  | 4.  | 0 | OCRAFTMAC 45-60-120 DAYS               |
| ARC 6.5  | 3.7 | 11.  | 3.7 | 0 | 1PREPARE CRAFT MACI PROGRAM PLAN       |
| ARC 6.5  | 3.  | 11.  | 3.  | 0 | OC&EChart 30-60-120 DAYS               |
| ARC 6.5  | 2.7 | 11.  | 2.7 | 0 | 1C&E EVALUATION TEAM CHARTERED         |
| NUDE11.  | 6.5 | 1.   | 2.  | 2 | 2CONVENE NCI WORKING GROUP             |
| ARC 12.  | 7.5 | 16.5 | 7.5 | 0 | OMKTSVY 30-45-60 DAYS                  |
| ARC 12.  | 7.2 | 16.5 | 7.2 | 0 | 1CONDUCT MARKET SURVEY & PREP RPT      |
| NUDE11.  | 2.5 | 1.   | 1.  | 2 | 2CCMM & ELCT ESTABLISHED               |
| ARC 12.  | 3.  | 16.5 | 3.  | 0 | OC&EVALPL 5-10-30 DAYS                 |
| ARC 12.  | 2.7 | 16.5 | 2.7 | 0 | 1CMPLT CCMM ELECT EVAL PLAN            |
| NUDE16.5 | 7.  | 1.   | 1.  | 2 | 2CCOMplete MARKET SURVEY               |
| ARC 17.5 | 7.5 | 22.  | 7.5 | 0 | OLUSERSVY 30-45-60 DAYS                |
| ARC 17.5 | 7.2 | 22.  | 7.2 | 0 | 1CONDUCT USER SURVEY & PREP RPT        |
| NUDE16.5 | 2.5 | 1.   | 1.  | 2 | 2INITIATE C&E SURVEY                   |
| ARC 17.5 | 3.  | 22.  | 3.  | 0 | OC&ESVY 60-90-120 DAYS                 |
| ARC 17.5 | 2.7 | 22.  | 2.7 | 0 | 1PERFORM C&E EVALUATION SURVEY         |
| NUDE22.  | 7.  | 1.   | 1.  | 2 | 2CCOMplete USER SURVEY                 |
| ARC 23.  | 7.5 | 27.  | 7.5 | 1 | OPKRPT 60-90-120 DAYS                  |
| ARC 23.  | 7.2 | 27.5 | 7.2 | 0 | 1PREP & CMPLT MKT/USER SVY RESULTS RPT |
| ARC 27.  | 7.5 | 27.  | 8.  | 1 | 0                                      |
| ARC 27.  | 8.  | 27.5 | 8.  | 0 | 0                                      |
| NUDE22.  | 2.5 | 1.   | 1.  | 2 | 2CCOMplete C&E SURVEY                  |
| ARC 23.  | 3.  | 46.  | 3.  | 0 | OC&ERPT 15-30-60 DAYS                  |
| ARC 23.  | 2.7 | 27.5 | 2.7 | 0 | 1PREP & CCOMplete C&E SURVEY REPORT    |
| NUDE27.5 | 6.5 | 1.   | 3.  | 2 | 2FINAL REPORT COMPLETE                 |
| ARC 28.5 | 7.  | 33.  | 9.  | 0 | OEVALLOG 15-30-60 DAYS                 |
| ARC 28.5 | 8.7 | 33.  | 8.7 | 0 | 1EVALUATE LOGISTICS CONSIDERATIONS     |
| ARC 28.5 | 3.  | 33.  | 8.  | 0 | 01ERTECCM 15-40-60 DAYS                |
| ARC 28.5 | 7.7 | 33.  | 7.7 | 0 | 1PREPARE IER - IECCM                   |
| ARC 28.5 | 7.  | 33.  | 7.  | 0 | 01ERTRACC 15-60-120 DAYS               |
| ARC 28.5 | 6.7 | 33.  | 6.7 | 0 | 1PREPARE IER - TRADOC                  |
| NUDE33.  | 3.5 | 1.   | 6.  | 2 | 2RECEIVE IPR INPLT, START IPR PACKAGE  |
| ARC 34.  | 6.5 | 38.5 | 6.5 | 0 | 0IPRPKG 45-60-90 DAYS                  |
| ARC 34.  | 6.2 | 38.5 | 6.2 | 0 | 1PREPARE AND STAFF IPR PACKAGE         |
| NUDE38.5 | 5.  | 1.   | 3.  | 2 | 3CONVENE MACP-I (IPR)                  |
| ARC 39.5 | 7.5 | 44.  | 7.5 | 0 | OR&EPRCC 30 DAYS <PROB=0.05>           |
| ARC 39.5 | 7.2 | 42.5 | 7.2 | 0 | 1PREPARE FOR R&D PROGRAM               |
| ARC 39.5 | 6.5 | 46.  | 6.5 | 0 | ONCICECS 15-30-45 DAYS <PROB=0.50>     |
| ARC 39.5 | 6.2 | 43.  | 6.2 | 0 | 1APPROVE NCI DECISION                  |
| ARC 39.5 | 5.5 | 44.  | 5.5 | 0 | OMACIPRCG 30 DAYS <PROB=0.05>          |

|          |      |       |      |   |   |
|----------|------|-------|------|---|---|
| ARC 39.5 | 5.2  | 42.5  | 5.2  | 0 | 1PREPARE FOR MACI PROGRAM                     |
| NODE44.  | 7.   | 1.    | 1.   | 2 | 1CCMMENCE R&D PROGRAM                         |
| NODE44.  | 5.   | 1.    | 1.   | 2 | 1CCMMENCE MACI PROGRAM                        |
| NODE46.  | 1.5  | 1.    | 10.  | 2 | 2CCMMENCE NDI PROGRAM                         |
| ARC 47.  | 11.  | 51.5  | 11.  | 0 | 0PREPFPC 90-150-210 DAYS                      |
| ARC 47.  | 10.7 | 51.5  | 10.7 | 0 | 1PREPARE FUNCTIONAL PURCHASE DESCRIP          |
| ARC 47.  | 10.  | 51.5  | 10.  | 0 | 0PREPLCR 60-70-90 DAYS                        |
| ARC 47.  | 9.7  | 51.5  | 9.7  | 0 | 1PREPARE LOGISTICS DATA REQUIREMENTS          |
| ARC 47.  | 9.   | 57.   | 9.   | 0 | 0CRFTMPI 50-60-80 DAYS                        |
| ARC 47.  | 8.7  | 51.5  | 8.7  | 0 | 1INITIAL DRAFT MATERIEL FIELDING PLAN         |
| ARC 47.  | 8.   | 57.   | 8.   | 0 | 0UPCIERTE 30-90-120 DAYS                      |
| ARC 47.  | 7.7  | 51.5  | 7.7  | 0 | 1UPDATE IER - IECCM                           |
| ARC 47.  | 7.   | 57.   | 7.   | 0 | 0UPCIERTR 30-90-120 DAYS                      |
| ARC 47.  | 6.7  | 51.5  | 6.7  | 0 | 1UPDATE IER - TRADOC                          |
| ARC 47.  | 6.   | 57.   | 6.   | 0 | 0FINCCPRI 60-120-180 DAYS                     |
| ARC 47.  | 5.7  | 51.5  | 5.7  | 0 | 1UPDATE AND FINALIZE QCPRI                    |
| ARC 47.  | 5.   | 51.5  | 5.   | 0 | 0PREAPP 90-120-150 DAYS                       |
| ARC 47.  | 4.7  | 51.5  | 4.7  | 0 | 1PREPARE ADVANCE PROCUREMENT PLAN             |
| ARC 47.  | 4.   | 51.5  | 4.   | 0 | 0FINNETPL 30-60-90 DAYS                       |
| ARC 47.  | 3.7  | 51.5  | 3.7  | 0 | 1FINALIZE NET PLAN                            |
| ARC 47.  | 3.   | 51.5  | 3.   | 0 | 0CEFMNPL 45-60-90 DAYS                        |
| ARC 47.  | 2.7  | 51.5  | 2.7  | 0 | 1FINALIZE DEPT/CNTR MAINT SPT PLAN            |
| ARC 47.  | 2.   | 51.5  | 2.   | 0 | 0FINPRCV 60-90-120 DAYS                       |
| ARC 47.  | 1.7  | 51.5  | 1.7  | 0 | 1INALIZE PROVISIONING PLAN                    |
| NODE51.5 | 9.5  | 1.    | 2.   | 2 | 2COMPLETE INPUTS TO PROCUREMENT PACKAGE       |
| ARC 52.5 | 10.5 | 57.   | 10.5 | 0 | 0CRAFTPPK 30-45-60 DAYS                       |
| ARC 52.5 | 10.2 | 57.   | 10.2 | 0 | 1PREPARE DRAFT PROCUREMENT PACKAGE            |
| NODE51.5 | 1.5  | 1.    | 4.   | 2 | 2COMPLETE INPLTS TO ACQUISITION PLAN          |
| ARC 52.5 | 3.5  | 57.   | 3.5  | 0 | 0FINAL-AP 30-45-60 DAYS                       |
| ARC 52.5 | 3.2  | 57.   | 3.2  | 0 | 1FINALIZE ACQUISITION PLAN                    |
| NODE57.  | 1.5  | 1.    | 10.  | 2 | 2CONVENE MACP-11 (IPR)                        |
| ARC 58.  | 10.5 | 62.5  | 10.5 | 0 | 0CRAFTMFP 50-60-80 DAYS                       |
| ARC 58.  | 10.2 | 62.5  | 10.2 | 0 | 1PREPARE DRAFT MATERIEL FIELDING PLAN         |
| ARC 58.  | 8.5  | 62.5  | 8.5  | 0 | 0ESTBNETT 120-140-180 DAYS                    |
| ARC 58.  | 8.2  | 62.5  | 8.2  | 0 | 1ESTABLISH NEW EQUIP TRNG TEAM                |
| ARC 58.  | 6.5  | 62.5  | 6.5  | 0 | 0FINPPK 120-180-210 DAYS                      |
| ARC 58.  | 6.2  | 62.5  | 6.2  | 0 | 1FINALIZE PROCUREMENT PACKAGE                 |
| NODE62.5 | 10.  | 1.    | 1.   | 2 | 2COMPLETE DRAFT MATERIEL FIELDING PLAN        |
| ARC 63.5 | 10.5 | 68.   | 10.5 | 0 | 0CCCRDMFP 90-90-120 DAYS                      |
| ARC 63.5 | 10.2 | 68.   | 10.2 | 0 | 1COORDINATE MATERIEL FIELDING PLAN            |
| NODE62.5 | 8.   | 1.    | 1.   | 2 | 2NEW EQUIP/IKPT ESTABLISHED                   |
| ARC 63.5 | 8.5  | 79.25 | 8.5  | 0 | 0TRNCREW1 10 DAYS                             |
| ARC 63.5 | 8.2  | 68.   | 8.2  | 0 | 1TRAIN INITIAL CREW                           |
| NODE62.5 | 6.   | 1.    | 1.   | 2 | 2ISSUE RFP FOR HARDWARE, CLS BOA              |
| ARC 63.5 | 6.5  | 68.   | 6.5  | 0 | 0PREPPSL 30-60-90 DAYS                        |
| ARC 63.5 | 6.2  | 68.   | 6.2  | 0 | 1PREPARE PROPCSALS                            |
| NODE68.  | 10.  | 1.    | 1.   | 2 | 2COORDINATION OF MFP COMPLETE                 |
| ARC 69.  | 10.5 | 73.5  | 10.5 | 0 | 0FIN-MFP 80-90-120 DAYS                       |
| ARC 69.  | 10.2 | 73.5  | 10.2 | 0 | 1PUBLISH MATERIEL FIELDING PLAN               |
| NODE68.  | 6.   | 1.    | 1.   | 2 | 2RECEIVE PROPOSALS FROM PROSPECTIVE SUPPLIERS |
| ARC 69.  | 6.5  | 73.5  | 6.5  | 0 | 0EVAL-FFP 30-60-90 DAYS                       |
| ARC 69.  | 6.2  | 73.5  | 6.2  | 0 | 1EVALUATE HARDWARE/SOFTWARE PROPOSALS         |
| NODE73.5 | 10.  | 1.    | 1.   | 2 | 2MATERIEL FIELDING PLAN COMPLETE              |
| ARC 74.5 | 10.5 | 79.25 | 10.5 | 0 | 0MFP-LEAD 180 DAYS                            |
| ARC 74.5 | 10.2 | 79.   | 10.2 | 0 | 1* SLACK * 6 MONTH LEAD TIME                  |



|           |      |        |      |   |  |
|-----------|------|--------|------|---|--|
| NCDE73.5  | 6.   | 1.     | 1.   | 2 | 2INITIATE NEGOTIATIONS                   |
| ARC 74.5  | 6.5  | 79.    | 6.5  | 0 | ONEG-FFP 24-30-40 DAYS                   |
| ARC 74.5  | 6.2  | 79.    | 6.2  | 0 | 1COMPLETE FFP CONTRACT NEGOTIATIONS      |
| CIRL79.5  | 17.5 | .25    |      |   | B  |
| CIRL79.5  | 8.5  | .25    |      |   | A  |
| NCDE79.   | 6.   | 1.     | 1.   | 2 | 2NEGOTIATIONS COMPLETED                  |
| ARC 80.   | 6.5  | 84.5   | 6.5  | 0 | 3PREAWDSY 24-30-60 DAYS                  |
| ARC 80.   | 6.2  | 84.5   | 6.2  | 0 | 1COMPLETE PRE-AWARD SURVEY FFP CNTRCT    |
| NCDE84.5  | 1.   | 1.     | 7.   | 2 | 2SURVEY COMPLETED                        |
| ARC 85.5  | 6.5  | 90.    | 6.5  | 0 | 0PRCC-AWD 24-30-45 DAYS                  |
| ARC 85.5  | 6.2  | 90.    | 6.2  | 0 | 1AWARC PRODUCTION FFP CONTRACT           |
| ARC 85.5  | 3.5  | 90.    | 3.5  | 0 | 0EVAL-BOA 30-45-60 DAYS                  |
| ARC 85.5  | 3.2  | 90.    | 3.2  | 0 | 1EVALUATE BOA PROPOSALS                  |
| ARC 85.5  | 1.5  | 90.    | 1.5  | 0 | 0EVAL-CLS 30-45-60 DAYS                  |
| ARC 85.5  | 1.2  | 90.    | 1.2  | 0 | 1EVALUATE CNTRCT LOG SPT PROPOSALS       |
| NCDE90.   | 5.   | 1.     | 3.   | 2 | 2AWARC PRODUCTION CONTRACT               |
| ARC 91.   | 7.5  | 95.5   | 7.5  | 0 | 0CCMMLTMS 120-160-210 DAYS               |
| ARC 91.   | 7.2  | 95.5   | 7.2  | 0 | 1PREPARE COMMERCIAL TMS                  |
| ARC 91.   | 6.5  | 101.   | 6.5  | 0 | 0FABCRFI 270-420-540 DAYS                |
| ARC 91.   | 6.2  | 101.   | 6.2  | 0 | 1FABRICATE FIRST CRAFT                   |
| ARC 91.   | 5.5  | 97.25  | 5.5  | 0 | 0PRCVISNG 720-1080-1440 DAYS             |
| ARC 91.   | 5.2  | 97.    | 5.2  | 0 | 1ACCOMPLISH FULL PROVISIONING            |
| NCDE90.   | 3.   | 1.     | 1.   | 2 | 2AWARC BOA OPTION                        |
| ARC 91.   | 3.5  | 95.5   | 3.5  | 0 | 0ASL/PLL 85-90-120 DAYS                  |
| ARC 91.   | 3.2  | 95.5   | 3.2  | 0 | 1ESTABLISH ASL/PLL                       |
| NCDE90.   | 1.   | 1.     | 1.   | 2 | 2AWARC CLS OPTION                        |
| ARC 91.   | 1.5  | 95.5   | 1.5  | 0 | 0ESTABCLS 100-140-180 DAYS               |
| ARC 91.   | 1.2  | 95.5   | 1.2  | 0 | 1ESTABLISH CLS FACILITY                  |
| NCDE95.5  | 7.   | 1.     | 4.   | 2 | 2RECEIVE COMMERCIAL TMS                  |
| ARC 96.5  | 9.5  | 101.   | 9.5  | 0 | 0SUPPLTMS 90-150-180 DAYS                |
| ARC 96.5  | 9.2  | 101.   | 9.2  | 0 | 1SUPPLEMENT COMM MANLAIS * VERIFY *      |
| ARC 96.5  | 7.5  | 101.   | 7.5  | 0 | 0TMLEAD1 90 DAYS                         |
| ARC 96.5  | 7.2  | 101.   | 7.2  | 0 | 1* SLACK * 90 DAY TECH MANUALS LEAD TIME |
| CIRL97.5  | 5.5  | .25    |      |   | C  |
| NCDE95.5  | 3.   | 1.     | 2.   | 2 | 2COMPLETE ASL/PLL                        |
| ARC 96.5  | 4.5  | 112.   | 4.5  | 0 | 0ASLLEADT 30 DAYS                        |
| ARC 96.5  | 4.2  | 101.   | 4.2  | 0 | 1* SLACK * 30 DAY ASL LEAD TIME          |
| ARC 96.5  | 3.5  | 101.25 | 3.5  | 0 | 0USE-BOA 1 DAY                           |
| ARC 96.5  | 3.2  | 101.   | 3.2  | 0 | 1UTILIZE BOA # DUMMY ACTIVITY #          |
| CIRL101.5 | 3.5  | .25    |      |   | C  |
| NCDE95.5  | 1.   | 1.     | 1.   | 2 | 2CLS FACILITY COMPLETED                  |
| ARC 96.5  | 1.5  | 112.   | 1.5  | 0 | 0CLSLEADT 30 DAYS                        |
| ARC 96.5  | 1.2  | 101.   | 1.2  | 0 | 1* SLACK * 30 DAY CLS LEAD TIME          |
| NCDE101.  | 9.   | 1.     | 2.   | 2 | 2ACCEPT INTERIM MANUALS                  |
| ARC 102.  | 17.5 | 108.25 | 17.5 | 0 | 0TAG-TMS 120-180-310 DAYS                |
| ARC 102.  | 17.2 | 106.5  | 17.2 | 0 | 1PREPARE AUTHENTICATED TAG MANUALS       |
| ARC 102.  | 9.5  | 109.25 | 9.5  | 0 | 0TMLEAD2 30 DAYS                         |
| ARC 102.  | 9.2  | 106.5  | 9.2  | 0 | 1* SLACK * 30 DAY TECH MANUAL LEAD TIME  |
| NCDE101.  | 6.   | 1.     | 2.   | 2 | 2DELIVER CRAFT 1                         |
| ARC 102.  | 7.   | 106.5  | 7.   | 0 | 0TRIALS 10-15-30 DAYS                    |
| ARC 102.  | 6.7  | 106.5  | 6.7  | 0 | 1CONDUCT COCK/SEA TRIALS                 |
| CIRL108.5 | 10.5 | .25    |      |   | E  |
| CIRL109.5 | 9.5  | .25    |      |   | F  |
| NCDE106.5 | 6.   | 1.     | 3.   | 2 | 2COCK/SEA TRIALS COMPLETED               |
| ARC 107.5 | 9.5  | 112.   | 8.5  | 0 | 0CORRECTN C-30-90 DAYS                   |



FILE: VFLTUGN1 DATA

A1 MIDWEST S+E COMPUTER CENTER

|              |      |          |      |   |  |
|--------------|------|----------|------|---|--|
| ARC 107.5    | 3.2  | 112.     | 3.2  | 0 | 1CORRECT TEST IDENTIFIED DEFICIENCIES    |
| ARC 107.5    | 7.5  | 112.     | 7.5  | 0 | 0LTRPTTEC 15-45-90 DAYS                  |
| ARC 107.5    | 7.2  | 112.     | 7.2  | 0 | 1PREPARE LETTER REPORT - TECOM           |
| ARC 107.5    | 6.5  | 112.     | 6.5  | 0 | 0LTRPTIRA 30-45-120 DAYS                 |
| ARC 107.5    | 6.2  | 112.     | 6.2  | 0 | 1PREPARE LETTER REPORT - TRADOC          |
| CIRL107.     | 3.   | .25      |      |   | A  |
| ARC 107.253. |      | 112.     | 3.   | 0 | 0TRNCREW1 10 DAYS                        |
| ARC 107.5    | 2.7  | 112.     | 2.7  | 0 | 1TRAIN INITIAL CREW                      |
| NUDE112.     | 10.  | 1.       | 1.   | 1 | 2TRADOC START IEP FOR FUE                |
| ARC 113.     | 10.5 | 117.5    | 10.5 | 0 | 0IEP-FUE 90-120-180 DAYS                 |
| ARC 113.     | 10.2 | 117.5    | 10.2 | 0 | 1PREPARE IEP FOR FUE - TRADOC            |
| NUDE112.     | 1.   | 1.       | 8.   | 2 | 2ACCEPT FIRST CRAFT                      |
| ARC 113.     | 8.5  | 117.5    | 8.5  | 0 | 0MTSP-FCE 60-70-120 DAYS                 |
| ARC 113.     | 8.2  | 117.5    | 8.2  | 0 | 1PREPARE MTSP FOR FUE                    |
| ARC 113.     | 5.   | 117.5    | 5.   | 0 | 0REL-LEAD 30-45-90 DAYS                  |
| ARC 113.     | 4.7  | 117.5    | 4.7  | 0 | 1PREPARE MATERIEL RELEASE PKG - COND     |
| ARC 113.     | 1.5  | 158.     | 1.5  | 0 | 0ACCP TREM 180-270-360 DAYS              |
| ARC 113.     | 1.2  | 117.5    | 1.2  | 0 | 1ACCEPT REMAINING CRAFT - QTY DEPEND - 2 |
| CIRL114.     | 6.   | .25      |      |   | F  |
| ARC 114.256. |      | 117.5    | 6.   | 0 | 0TMLEAD2 30 DAYS                         |
| ARC 114.5    | 5.7  | 117.5    | 5.7  | 0 | 130 DAY TM LEAD TIME                     |
| NUDE117.5    | 8.   | 1.       | 3.   | 2 | 2INITIATE FUE                            |
| ARC 118.5    | 9.5  | 123.     | 9.5  | 0 | 0PERF-FCE 30-45-90 DAYS                  |
| ARC 118.5    | 9.2  | 123.     | 9.2  | 0 | 1PERFORM FUE                             |
| NUDE117.5    | 4.5  | 1.       | 2.   | 2 | 2CONDITIONAL RELEASE                     |
| ARC 118.5    | 6.   | 145.     | 6.   | 0 | 0FRELLEAD 30-45-90 DAYS                  |
| ARC 118.5    | 5.7  | 123.     | 5.7  | 0 | 1PREPARE FULL RELEASE PACKAGE            |
| ARC 118.5    | 5.   | 123.255. |      | 0 | 0IOCLEAD2 1 DAY                          |
| ARC 118.5    | 4.7  | 123.     | 4.7  | 0 | 1* SLACK * LEAD TIME - COND REL TO ICC   |
| NUDE123.     | 9.   | 1.       | 1.   | 2 | 2COMPLETE FCE                            |
| ARC 124.     | 9.5  | 123.5    | 9.5  | 0 | 0FCE-IER 45-65-90 DAYS                   |
| ARC 124.     | 9.2  | 123.5    | 9.2  | 0 | 1PREPARE IER FOR FUE - TRADOC            |
| CIRL123.5    | 5.   | .25      |      |   | G  |
| NUDE128.5    | 9.   | 1.       | 1.   | 2 | 2COMPLETE IER FOR FUE                    |
| ARC 129.5    | 9.5  | 134.     | 9.5  | 0 | 0STAFFIER 50-60-90 DAYS                  |
| ARC 129.5    | 9.2  | 134.     | 9.2  | 0 | 1STAFF INDEPENDENT EVAL REPORT           |
| NUDE134.     | 9.   | 1.       | 1.   | 2 | 2COMPLETE STAFFING OF IER                |
| ARC 135.     | 9.5  | 139.5    | 9.5  | 0 | 0FLCIPRPK 75-90-120 DAYS                 |
| ARC 135.     | 9.2  | 139.5    | 9.2  | 0 | 1STAFF THE FIELDING IPR PACKAGE          |
| NUDE139.5    | 9.   | 1.       | 1.   | 2 | 2CMPL FLCC IPR PKG FOR FULL REL          |
| ARC 140.5    | 9.5  | 145.     | 9.5  | 0 | 0FLRELCCC 35-35-75 DAYS                  |
| ARC 140.5    | 9.2  | 145.     | 9.2  | 0 | 1STAFF THE FULL RELEASE DOCUMENTATION    |
| CIRL140.     | 8.   | .25      |      |   | E  |
| ARC 140.258. |      | 145.     | 8.   | 0 | 0TAG-TMS 120-180-310 DAYS                |
| ARC 140.5    | 7.7  | 145.     | 7.7  | 0 | 1PREPARE AUTHENTICATED TAG MANUALS       |
| CIRL141.     | 7.   | .25      |      |   | C  |
| ARC 141.257. |      | 145.     | 7.   | 0 | 0PROVISNG 720-1080-1440 DAYS             |
| ARC 141.5    | 6.7  | 145.     | 6.7  | 0 | 1ACCCOMPLISH FULL PROVISIONING           |
| CIRL140.     | 5.   | .25      |      |   | D  |
| ARC 140.255. |      | 145.     | 5.   | 0 | 0LSE-BCA 1 DAY                           |
| ARC 140.5    | 4.7  | 145.     | 4.7  | 0 | 1UTILIZE BOA - CUMMY ACTY                |
| NUDE145.     | 4.   | 1.       | 6.   | 2 | 2FULL RELEASE                            |
| ARC 146.     | 7.   | 151.5    | 7.   | 0 | 0IOCLEAD1 1 DAY                          |
| ARC 146.     | 6.7  | 151.5    | 6.7  | 0 | 1* SLACK * LEAD TIME - FULL REL TO ICC   |
| CIRL147.     | 6.   | .25      |      |   | G  |

|               |           |   |   |
|---------------|-----------|---|---|
| ARC 147.256.  | 151.5 6.  | 0 | 0ICCLEAD2 1 DAY                         |
| ARC 147.5 5.7 | 151.5 5.7 | 0 | 1* SLACK * LEAD TIME - COND REL TO IOC  |
| NODE151.5 5.5 | 1. 2.     | 4 | 2CUMMY NODE TO GET IOC                  |
| ARC 152.5 6.5 | 158. 6.5  | 0 | OLEAD-IOC 1 DAY                         |
| ARC 152.5 6.2 | 158. 6.2  | 0 | 1* SLACK * LOGIC -MIN LT- FULL/COND REL |
| CIRL154. 5.5  | .25       | 9 |   |
| ARC 154.255.5 | 158. 5.5  | 0 | JMFP-LEAD 180 DAYS                      |
| ARC 154.5 5.2 | 158. 5.2  | 0 | 1* SLACK * 6 MONTH LEAD TIME            |
| NODE153. 5.   | 1. 2.     | 2 | 1INITIAL OPERATIONAL CAPABILITY         |
| NODE153. 1.   | 1. 1.     | 2 | 1FINAL CRAFT DELIVERED                  |
| END           |           |   |   |

```
&CONTROL CFF
```

```
-INIT
```

```
&IF .&1 = . &GOTO -CONT
```

```
&IF .&1 = .END &GOTO -FIN
```

```
&IF .&1 = .S &GOTO -RET2
```

```
&IF .&1 = .R &GOTO -RET
```

```
&IF .&1 = .6 &GOTO -END6
```

```
&IF .&1 = .5 &GOTO -END5
```

```
&IF .&1 = .4 &GOTO -END4
```

```
&IF .&1 = .3 &GOTO -END3
```

```
&IF .&1 = .2 &GOTO -END2
```

```
&IF .&1 = .1 &GOTO -END1
```

```
-CONT
```

```
&BEGTYPE
```

```
TERTIARY MENU LEVEL: ENTER THE OPTION DESIRED :
```

```
1 = EDIT THE LISTING OF VERT EXECUTIVE PROCEDURES
```

```
2 = EDIT THE LISTING OF VERT SOURCE PROGRAMS
```

```
3 = EDIT THE LISTING OF VERT INPUT DATA FILES
```

```
4 = EDIT THE LISTING OF VERT OUTPUT DATA FILES
```

```
5 = EDIT THE LISTING OF VERT GRAPHICS DATA FILES
```

```
6 = EDIT THE LISTING OF VERT PLOT PREVIEW DATA FILES
```

```
R = RETURN TO THE MAIN MENU LEVEL
```

```
S = RETURN TO THE SECONDARY MENU LEVEL
```

```
END = END THE SESSION
```

```
&ENDTYPE
```

```
&READ ARGS
```

```
&GOTO -INIT
```

```
-END1
```

```
&BEGSTACK
```

```
TCP
```

```
&END
```

```
EDIT VERTIND1 DATA A1
```

```
&GOTO -PASS
```

```
-END2
```

```
&BEGSTACK
```

```
TCP
```

```
&END
```

```
EDIT VERTIND2 DATA A1
```

```
&GOTO -PASS
```

```
-END3
```

```
&BEGSTACK
```

```
TCP
```

```
&END
```

```
EDIT VERTIND3 DATA A1
```

```
&GOTO -PASS
```

```
-END4
&BEGSTACK
TLP
&END
EDIT VERTIND4 DATA A1
&GCTC -PASS
-END5
&BEGSTACK
TLP
&END
EDIT VERTIND5 DATA A1
&GCTC -PASS
-END6
&BEGSTACK
TLP
&END
EDIT VERTIND6 DATA A1
&GCTC -PASS
-PASS
&ARGS
&GCTC -INIT
-FIN
&GLCBAL1 = 2
&GCTC -RET2
-RET
&GLCBAL2 = 2
&GCTC -RET2
-RET2
```

FILE: VERITERM EXEC      A1    MIDWEST S+E COMPUTER CENTER

```

*
*****
*
* EXEC WRITTEN BY:
*
*     LONNIE D. ANTWILER
*     3 MARCH 1981
*
*****
*
*
*
&CONTROL CFF
CP SET EMSG CFF
*&ERROR &GOTO -END
&COUNT = 31
&START = 1
&STCNT = 1
&IF &&INDEX NE NUM &GOTO -L13
&STCNT = 0
&IF &INDEX = 3 &ARGS &1 &2
&IF &INDEX = 4 &ARGS &1 &2 &3
&IF &INDEX = 5 &ARGS &1 &2 &3 &4
&IF &INDEX = 6 &ARGS &1 &2 &3 &4 &5
-L13 &END     = &COUNT - &STCNT
&CUT     = TEK
&FM     = A
&IF &1 = ? &GOTO -HELP
&IF &INDEX = 2 &GOTO -DONE
&IF &INDEX = 3 &IF &3 = TEK &GOTO -DONE
&IF &INDEX = 3 &IF &3 = AGILE &GOTO -L1
&TEST = &DATATYPE &3
&IF &INDEX = 3 &IF &TEST = NUM &GOTO -L2
&IF &INDEX = 3 &IF &TEST = CHAR &GOTO -L3
&IF &INDEX = 4 &IF &TEST = NUM &GOTO -L4
&IF &INDEX = 4 &IF &TEST = CHAR &GOTO -L5
&IF &INDEX > 5 &GOTO -END
&FM = &3
&COUNT = &4
&TEST = &DATATYPE &COUNT
&IF &TEST = CHAR &GOTO -L8
&END     = &COUNT - &STCNT
&IF &5 NE TEK &CUT = AGILE
-DONE &CONTINUE
&IF &CUT = TEK &SKIP 3
&IF &CUT = AGILE &SKIP 2
&TYPE TERMINAL TYPE MUST BE TEK OR AGILE
&GOTO -END
&TEST = &DATATYPE &COUNT
&IF &TEST = NUM &SKIP 2
-L8 &TYPE EXPECTED TO RECEIVE THE NUMBER OF LINES PER PAGE
&GOTO -END
&LEN = &LENGTH &FM
&IF &LEN <= 2 &SKIP 2
&TYPE FILE MODE IS WRONG

```

```

&GCTC -END
STATE &1 &2 &FM
&IF &RETCCDE NE 0 &GCTC -ERRCK
&IF &CUT = TEK &SKIP 5
&TYPE DO YOU WANT TO STOP AT PAGE BREAKS (YES OR NO)?
&READ VARS &PGBRK
&IF .&PGBRK NE .YES &PGBRK = NO
&TYPE
&GCTC -L7
&BEGTYPE

```

```

&END
-L7 &CCONTINUE
&IF &STCNT = 1 &IF &CUT = TEK &TYPE &1 &2 &FM
&IF &STCNT = 1 &IF &CUT = AGILE &TYPE &1 &2 &FM
-LCCP &CCONTINUE
T &1 &2 &FM &START &END
&IF &RETCCDE NE 0 &GCTC -END
&IF &CUT = TEK &SKIP 3
&IF &PGBRK = YES &READ VARS &DUMMY
&TYPE
&GCTC -L6
&READ VARS &DUMMY
&BEGTYPE

```

```

&END
-L6 &IF &START = 1 &IF &STCNT = 1 &START = 0
&IF .&DUMMY = . &GCTC -L9
&TEST = &DATATYPE &DUMMY
&IF &TEST = CHAR &GCTC -L9
&IF &DUMMY = 0 &GCTC -L9
&IF &DUMMY < 0 &GCTC -L11
&LCCP -L10 &DUMMY
&START = &START + &CCUNT
-L10 &END = &END + &CCUNT
&GCTC -L9
-L11 &DUMMY = -1 - &DUMMY
&LCCP -L12 &DUMMY
&START = &START - &CCUNT
-L12 &END = &END - &CCUNT
&IF &START < 1 &END = &CCUNT - &STCNT
&IF &START < 1 &START = 1
&IF &START = 1 &GCTC -L7
&GCTC -LCCP
-L9 &CCONTINUE
&START = &START + &CCUNT
&END = &END + &CCUNT
&GCTC -LCCP
-L1 &CUT = AGILE
&GCTC -DLNE
-HELP &CCONTINUE

```

&BEGTYPE

THERE ARE 6 PARAMETERS:

FN      - FILE NAME  
FT      - FILE TYPE  
FM      - FILE MODE  
LINES - NUMBER OF LINES PER PAGE  
TERM   - TERMINAL TYPE (AGILE OR TEK)  
NCH    - NO HEADER WILL BE PRINTED

DEFAULT   A  
DEFAULT   31  
DEFAULT   TEK

NOTE ON THE TEKTRONIX TERMINAL:

CHAR 1 - ESC 8 - 31 LINES/PAGE  
CHAR 2 - ESC 9 - 34 LINES/PAGE  
CHAR 3 - ESC : - 54 LINES/PAGE  
CHAR 4 - ESC ; - 60 LINES/PAGE

NOTE ON THE AGILE PRINTER:

MAXIMUM IS 66 LINES/PAGE

&END

&GOTO -END

-L2 &COUNT = &3

&TEST = &DATATYPE &COUNT

&IF &TEST = CHAR &GOTO -L3

&END = &COUNT - &STCNT

&GOTO -DCNE

-L3 &FM = &3

&GOTO -DCNE

-L4 &COUNT = &3

&TEST = &DATATYPE &COUNT

&IF &TEST = CHAR &GOTO -L3

&END = &COUNT - &STCNT

&IF &4 = AGILE &OUT = AGILE

&GOTO -DCNE

-L5 &FM = &3

&TEST = &DATATYPE &4

&IF &4 = TEK &GOTO -DCNE

&IF &TEST = CHAR &OUT = AGILE

&IF &TEST = NUM &COUNT = &4

&IF &TEST = NUM &END = &COUNT - &STCNT

&GOTO -DCNE

-ERROR &TYPE FILE " &1 &2 &FM " NOT FOUND

-END CP SET EMSG TEXT

&CONTROL CMS



APPENDIX E

USER'S MANUAL FOR THE VERTPLOT PROGRAM

# VERTPLOT

This program plots publication quality copies of VERT networks using the CALCOMP plotter. Three different types of elements along with an accompanying maximum of seventy two digits of alpha-numeric identification information are plotted by this program. These elements are (1) a node, (2) an arc and (3) a circle which is used for making discontinuous arc connections. The plot location of each network element must be specified. This feature makes it possible to stylize a network to gain a maximum of ease of comprehension as opposed to ease of run off as afforded by a fully automated network plotting program. These automated programs usually arbitrarily locate each element in the network irrespective of the function it performs. In order to position each element in the plot, an origin for the whole plot must be established. The origin serves as location base from which all measurements are made. It can be a corner of a critical node, a starting node, an artificial lower left hand corner of a plot, etc. After establishing an origin, each network element's position is then established relative to the origin in units of X and Y inches. This program is setup for a CALCOMP drum type plotter which uses a roll of velum paper to plot on. The X-axis of the origin lies parallel to the roll's bottom edge while the Y-axis is perpendicular to that same edge. The maximum overall plot length allowed (the maximum in the X direction) is controlled by the variable labeled SPAN in the computer listing. Similarly, the maximum height (the maximum in the Y direction) is controlled by WIDTH. The variable BOTTOM moves the pen off the bottom edge of the paper by the value assigned this variable. The values given these variables, which must be in inches, can readily be adjusted to accommodate the various sizes of plotters and lengths of velum paper available.

Additional features of this program include the options of entering the height of the annotation (letter height); node, arc and circle size; and the overall scale of the plot. The scale feature enables making small notebook size plots as well as large wall hanging demonstration plots.

## A. Definition of Inputs

Data elements include entering first an identification-control card followed by a mixture of node, arc and circle cards which sequentially plots the network. Plotting the node, arcs and circles in the natural sequence in which they lie on the plot will greatly reduce the pen travel time. Thus, entering all the node, arc or circle cards in separate groups should be avoided. Following the last card of the plot, an END card must be entered to signal the end of the plot. Multiple plots can be stacked one behind another to form a job stream of plots for a single computer run.

### A1. Identification Control Card

Columns 1-72, FORMAT 72A1. Enter any alpha-numeric information deemed helpful in identifying this run. This data will be printed as a title at the top of the plot. If a title is not wanted, leave this field blank.

Columns 73-76, FORMAT F4.0. Enter the scale use to make the plot. Entering a 1.0 will produce a 1 = 1, normal sized plot, while entering a 2.0 will produce a plot twice the normal size. If the field is left blank, this program will default to a scale value of 1.0.

Columns 77-79, FORMAT F3.0. Enter the annotation height in inches used for the arc and node names and the circle symbols. If this field is left blank, the program will default to 0.1 inches.

Column 80, FORMAT I1. To sharpen the lines and to patch up places where the pen may skip, it is necessary to have the pen travel over each line a repeated number of times. The repeat factor is carried in this column. If a zero is entered or if this field is left blank, the program will assume that once is enough. To hold down cost, this field should be left blank on initial debug type runs.

#### A2. Node Card

Columns 1-4, FORMAT A4. Enter the card type identifier - Node.

Columns 5-10, FORMAT F6.0. Relative to the origin, enter in inches the X coordinate of the lower left hand corner of this node.

Columns 11-16, FORMAT F6.0. Relative to the origin, enter in inches the Y coordinate of the lower left hand corner of this node.

Columns 17-22, FORMAT F6.0. Enter in inches the node width. If this field is left blank, the program will default to a value of five times the annotation height (columns 77-80 of the identification-control card).

Columns 23-28, FORMAT F6.0. Enter in inches the height of the node. If this field is left blank, the program will default to a value of ten times the annotation height (columns 77-80 of the identification-control card).

Columns 29-32, FORMAT I4. Enter the input logic code number (defined as follows).

| Input Logic Code Number | Type of Input Logic |
|-------------------------|---------------------|
| 1                       | INITIAL             |
| 2                       | AND                 |
| 3                       | PARTIAL AND         |
| 4                       | OR                  |
| 5                       | COMPARE             |
| 6                       | PREFERRED           |
| 7                       | QUEUE               |
| 8                       | SORT                |

Columns 33-36, FORMAT I4. Enter the output logic code number (defined below) or enter the number of servers desired if QUEUE logic is used or enter the number of output arcs desired to be initiated if COMPARE or PREFERRED input logic was requested. Under this latter option, a minus sign (-) must prefix this number if utilization of the desired condition is wanted. Otherwise, this number will be picked up as a positive number and thus the demand condition will be used.

| Output Logic Code Number | Type of Output Logic |
|--------------------------|----------------------|
| 1                        | TERMINAL             |
| 2                        | ALL                  |
| 3                        | MONTE CARLO          |
| 4                        | FILTER 1             |
| 5                        | FILTER 2             |
| 6                        | FILTER 3             |

Columns 37-80, FORMAT 44A1. Enter the name of the node being plotted followed by any other comments desired. This information will be printed in one straight line centered below the node, at a distance of one annotation height (columns 77-79 of the identification-control card) away from the node and lastly, at a height of one annotation.

### A3.Arc Card

Columns 1-4, FORMAT A4. Enter the card type identifier - ARC.

Columns 5-10, FORMAT F6.0. Relative to the origin, enter in inches the X coordinate of one end of the arc.

Columns 11-16, FORMAT F6.0. Relative to the origin, enter in inches the Y coordinate of the same end point defined in the previous field.

Columns 17-22, FORMAT F6.0. Relative to the origin, enter in inches the X coordinate of the remaining end of the arc.

Columns 23-28, FORMAT F6.0. Relative to the origin, enter in inches the Y coordinate of the same end point defined in the previous field.

Columns 29-32, FORMAT I4. Enter a "1" in column 32 to suppress getting an arrowhead on the end point defined by the previous two fields. Otherwise, leave this field blank to get the arrowhead.

Columns 33-36, FORMAT I4. Enter a "1" in column 36 to suppress getting both an arrowhead and an arc line. Otherwise, leave this field blank to get both if the arrowhead has not been already suppressed via the previous field.

Columns 37-80, FORMAT 44A1. Enter the name of the arc being plotted followed by any other comments desired. This information will be printed in one straight line parallel and above the arc line, at a distance of one annotation height (columns 77-79 of the identification-control card) away from the arc line. Printing will start at a distance of one annotation height inside the left hand end of the arc line and will have a height of one annotation. This field should be left blank if a straight line without any printing above it is desired.

#### A4.Circle Card

Columns 1-4, FORMAT A4. Enter the card type identifier - CIRL.

Columns 5-10, FORMAT F6.0. Relative to the origin, enter in inches the X coordinate of the center of the circle.

Columns 11-16, FORMAT F6.0. Relative to the origin, enter in inches the Y coordinate of the center of the circle.

Columns 17-22, FORMAT F6.0. Enter in inches the radius of the circle desired. If this field is left blank, the program will default to a value of 2.5 times the annotation height (columns 77-80 of the identification-control card).

Columns 23-32. Leave blank.

Columns 33-36, FORMAT I4. Enter a "1" in column 36 to suppress getting the circle (use this when just printing symbols).

Columns 37-80, FORMAT 44A1. Enter the symbol(s) desired to be plotted in the center of the circle. This information will be plotted the height of the annotation (columns 77-79 of the identification-control card). This field should be left blank if a circle without any symbols printed in it is desired.

#### A5.End Card

Columns 1-4, FORMAT A4. Enter the card type identifier - END.

Columns 5-80. Leave blank.

NOTE: If an error is encountered while reading in the data and checking to see if the plot will fit within the allowed boundaries, the run will be scrapped before attempting to plot it.

#### B. Error Messages

1144 A negative value for the scale (columns 73-76 of the identification-control card) is not allowed.

- 1155 A negative value for the annotation height (columns 77-79 of the identification-control card) is not allowed.
- 1233 The following node was given a negative value for its width.
- 1244 The following node was given a negative value for its height.
- 1255 The following node does not have a name.
- 1288 The input logic of the following node is incorrect.
- 1299 The output logic of the following node is incorrect.
- 1300 The following node is not wide enough to accommodate printing the name of the logic within the node.
- 1311 The following node is not tall enough to accommodate printing the name of the logic within the node.
- 1355 The number of output arcs desired to be initiated for the following node having either COMPARE or PREFERRED logic is incorrect.
- 1377 The number of servers for the following node having QUEUE logic is incorrect.
- 1399 The following node is designated as having SORT logic columns 29-32 should not have any entries.
- 1455 The following arcs slope is too steep to allow printing its name.
- 1500 The following circle has a negative value for its radius.
- 1566 The following card does not have an acceptable card type identifier (columns 1-4).
- 1655 The dimensions of this problem are so great that the plot scale must be reduced to less than the unacceptable level of 0.05.



| COMPUTER TAPE/MEMORY LAYOUT<br>(SOP 700-ZP-2) |      |                            |                            |                                    |                                      |                                |                                |                         |  | DATE  |                              | TAPE IDENT                |    |                           |    |                        |    |
|---|------|----------------------------|----------------------------|------------------------------------|--------------------------------------|--------------------------------|--------------------------------|-------------------------|--|---|------------------------------|---------------------------|----|---------------------------|----|------------------------|----|
| PROJECT NO                                    |      | PROJECT TITLE              |                            |                                    |                                      | PROGRAMMER                     |                                |                         |  | BLOCKED<br><input type="checkbox"/> YES <input type="checkbox"/> NO |                              |                           |    |                           |    |                        |    |
| VERT PLOT DATA CARDS LAYOUT                   |      |                            |                            |                                    |                                      |                                |                                |                         |  | BLOCKING FACTOR   |                              |                           |    |                           |    |                        |    |
| TITLE<br>(72A1)                               |      |                            |                            |                                    |                                      |                                |                                |                         |  | SCALE<br>(1.0)<br>F4.0  | HEIGHT<br>(0.1)<br>F3.0      | REPEAT<br>FACTOR<br>I1    |    |                           |    |                        |    |
| ID  |      |                            |                            |                                    |                                      |                                |                                |                         |  |   |                              |                           |    |                           |    |                        |    |
| Node  | A4   | X-Coord.<br>F6.0           | Y-Coord.<br>F6.0           | NODE<br>WIDTH<br>(5.0 Ann)<br>F6.0 | NODE<br>HEIGHT<br>(10.0 Ann)<br>F6.0 | LOGIC<br>CODE<br>No.<br>30     | OUTPUT<br>LOGIC<br>No.<br>I4   | NODE NAME<br>(44A1)     |  |   |                              | Red = Default Values      |    |                           |    |                        |    |
| Arc   | ARC  | X-Coord.<br>Begin<br>F6.0  | Y-Coord.<br>Begin<br>F6.0  | X-Coord.<br>End<br>F6.0            | Y-Coord.<br>End<br>F6.0              | ARC<br>HEAD<br>0 or 1<br>30    | ARC<br>LINE<br>0 or 1<br>I4    | ARC COMMENTS<br>(44A1)  |  |   |                              |                           |    |                           |    |                        |    |
| Circle  | CIRL | X-Coord.<br>Center<br>F6.0 | Y-Coord.<br>Center<br>F6.0 | Radius<br>(2.5 Ann)<br>F6.0        | Blank                                | Circle<br>Code<br>0 or 1<br>30 | Circle<br>Line<br>0 or 1<br>I4 | CIRCLE SYMBOL<br>(44A1) |  |   |                              |                           |    |                           |    |                        |    |
| END   | END  | BLANK                      |                            |                                    |                                      |                                |                                |                         |  |   |                              |                           |    |                           |    |                        |    |
|   |      |                            |                            |                                    |                                      |                                |                                |                         |  |   |                              |                           |    |                           |    |                        |    |
| IHOLD (44A1)<br>Title                         |      |                            |                            |                                    |                                      |                                |                                |                         |  | J   | JDF<br>1, 2, 3<br># of cards | X0<br>LL coord. of a node | Y0 | X1<br>LR coord. of a node | Y1 | XN<br>Coord. of a node | YN |

AMSAV.CANGE  
7 May 69

LIN LOT  
ARROWD LNC LINE  
1.0

Edition of 21 Mar 68, may be used.



APPENDIX F

SAMPLE SESSION NUMBER 1:

GET A DESCRIPTION OF VERT DATASETS

USED BY THE MENU TECHNIQUE

(AGILE Line Printer)

enter class 116600 ← class "160" is 300 baud  
class 160 start  
cms6 ← Enter to Get Into CMS  
ready to ibm

S+E VM/SP ONLINE Depress "RETURN" Button  
! ←

.log fpkerly  
ENTER PASSWORD: } Enter Userid and Password  
.#####

DASD 190 LINKED R/O; R/W BY MAINT; R/O BY 030 USERS  
DASD 19E LINKED R/O; R/W BY MAINT; R/O BY 029 USERS  
DASD 196 LINKED R/W; R/O BY FTBACKUP  
LOGMSG \* 09:58:45 CDT TUESDAY 07/20/82  
\*THE 3705 WILL BETAKEN OFFLINE AT 1200 HRS CDT 7/20/82. UNTIL  
\*FURTHER NOTICE ALL LINES WILL GO THRU THE COMTEN. THE ONLY  
\*VALID PACX CLASSES ARE 160-162: 160 = 300-1800 BPS, 161 = 2400-4800 BPS

\* AND 162 = 9600 BPS.

LOGON AT 07:29:19 CDT FRIDAY 07/23/82  
MIDWEST S+E COMPUTER CENTER

. ← Depress "RETURN" Button

Y (19E) R/O  
CMSZER SYSTEM NAME 'CMSZER' NOT AVAILABLE.  
CMSSEG SYSTEM NAME 'CMSSEG' NOT AVAILABLE.  
DASD 291 DEFINED  
'19E' REPLACES ' Y (19E) '

Y (19E) R/O  
E (194) R/O

R; ← CMS "READY" Mode

.vertex ← Enter the Name of the Executive File  
E (194) R/O Which Runs the Menu Technique

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

.list ← I chose to Get a Listing of the VERT  
Data sets Used by the Menu Technique

SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED : ←

To Get This Menu on a separate Page, I Simply Rolled the Paper Forward To a New Page Before Depressing the "RETURN" Button After Entering "list" Above

- 1 - DISPLAY A LISTING OF VERT EXECUTIVE PROCEDURES
- 2 - DISPLAY A LISTING OF VERT SOURCE PROGRAMS
- 3 - DISPLAY A LISTING OF VERT INPUT DATA FILES
- 4 - DISPLAY A LISTING OF VERT OUTPUT DATA FILES
- 5 - DISPLAY A LISTING OF VERT GRAPHICS DATA FILES
- 6 - DISPLAY A LISTING OF VERT PLOT PREVIEW DATA FILES
- 7 - GET LISTING MENU FOR EDITING THE ABOVE DATA FILES
- R - RETURN TO THE MAIN MENU LEVEL
- END - END THE SESSION

.1 ← I chose to Look at the Executive Files

ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:  
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL  
OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

- 1 → TEKTRONIX 4014 GRAPHICS TERMINAL
- 2 → AGILE LINE PRINTER

.2

NOTE:

ON THE TEKTRONIX TERMINAL:  
CHAR 1 → ESC 8 - 31 LINES/PAGE  
CHAR 2 → ESC 9 - 34 LINES/PAGE  
CHAR 3 → ESC : - 54 LINES/PAGE  
CHAR 4 → ESC ; - 60 LINES/PAGE

ON THE AGILE PRINTER:  
MAXIMUM IS 66 LINES/PAGE

ENTER THE NUMBER OF LINES/PAGE DESIRED

.50

DO YOU WANT TO STOP AT PAGE BREAKS ( YES OR NO ) ?

.yes ←

If You Don't Stop At Page Breaks  
the whole File will Be Printed  
Before stopping

VERTEX EXEC A1 \*DISPLAYS AND RUNS THE MAIN LEVEL MENU  
 VERTRUN EXEC A1 \*RUNS THE VERT MODULES VERTNEW AND VERTNEW1 ONLINE  
 VERTBAT EXEC A1 \*RUNS THE VERT MODULES VERTNEW AND VERTNEW1 OFFLINE  
 VERTTEST EXEC A1 \*DISPLAYS VERT OUTPUT FROM EITHER AN ONLINE OR OFFLINE RUN  
 VERTREAD EXEC A1 \*READS THE CONSOLE FILES TO CHECK IF A VERT OFFLINE JOB HAS COMPLETED <THIS EXEC IS A PART OF THE VERTTEST EXEC>  
 VERTIN EXEC A1 \*RUNS THE VERTINP AND VERTFREE EXECS WHICH ALLOW CREATION OF A FIXED FORM OR FREE FORM VERT INPUT DATA FILE  
 VERTINP EXEC A1 \*ALLOWS CREATION OF A FIXED FORM VERT INPUT DATA FILE  
 VERTFREE EXEC A1 \*RUNS THE FREE FORM VERT INPUT FILE MODULE (VERTFREE)  
 VERTEDIT EXEC A1 \*EDITS EXISTING VERT INPUT DATA FILES  
 VERTPLT EXEC A1 \*DISPLAYS AND RUNS THE SECONDARY LEVEL PLOT MENU  
 VERTPLT1 EXEC A1 \*ALLOWS CREATION OF A VERT NETWORK PLOT DATA FILE  
 VERTPLT2 EXEC A1 \*EDITS EXISTING VERT NETWORK PLOT DATA FILES  
 VERTPLT3 EXEC A1 \*RUNS THE VERTPLOT EXEC FOR DISPLAYING A VERT NETWORK PLOT  
 VERTPLT4 EXEC A1 \*DISPLAYS THE SAMPLE VERT NETWORK PLOT  
 VERTPLOT EXEC A1 \*RUNS THE VERTPLOT MODULE FOR DISPLAYING A VERT NETWORK PLOT  
 VERTGRAF EXEC A1 \*DISPLAYS AND RUNS THE SECONDARY LEVEL GRAPHICS MENU  
 VERTGRF1 EXEC A1 \*DISPLAYS VERT GRAPHS USING TELEGRAF BANKDATA FILES  
 VERTGRF2 EXEC A1 \*ALLOWS CREATION OF MANUALLY INPUTTED GRAPHICS DATA FILES  
 VERTGRF3 EXEC A1 \*EDITS EXISTING MANUALLY CREATED GRAPHICS DATA FILES  
 VERTGRF4 EXEC A1 \*DISPLAYS MANUALLY CREATED GRAPHICS DATA FILES  
 VERTGRF5 EXEC A1 \*DISPLAYS THE SAMPLE VERT GRAPHS  
 VERTINDX EXEC A1 \*DISPLAYS AND RUNS THE SECONDARY LEVEL LIST MENU  
 VERTIND1 EXEC A1 \*LISTS THE VERT EXECUTIVE PROCEDURES  
 VERTIND2 EXEC A1 \*LISTS THE VERT SOURCE PROGRAMS AND MODULES

← To Get the Listing to Begin  
 at the Top of the Page,  
 Position the Paper to the  
 Top of the Page and Depress  
 the "RESET" Button on the  
 AGILE Printer Before Depressing  
 the "RETURN" Button After  
 Entering "yes" Above

. ← Before Depressing the "RETURN" Button, I Repositioned the Paper and  
 Depressed the "RESET" Button. All Subsequent Lists Should Now Begin at  
 the Top of the Page

VERTIND3 EXEC A1 -LISTS THE VERT INPUT DATA FILES  
VERTIND4 EXEC A1 \*LISTS THE VERT OUTPUT DATA FILES  
VERTIND5 EXEC A1 \*LISTS THE VERT GRAPHICS DATA FILES  
VERTIND6 EXEC A1 -LISTS THE VERT PLOT DATA FILES  
VERTIND7 EXEC A1 \*DISPLAYS AND RUNS THE TERTIARY LEVEL INDEX UPDATE MENU  
VERTTERM EXEC A1 \*CONTROLS THE INDEX LISTS TO 22 LINES OF TEXT PER SCREEN  
-EOF\*

• ← Depress "RETURN" Button to Continue

SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 - DISPLAY A LISTING OF VERT EXECUTIVE PROCEDURES
- 2 - DISPLAY A LISTING OF VERT SOURCE PROGRAMS
- 3 - DISPLAY A LISTING OF VERT INPUT DATA FILES
- 4 - DISPLAY A LISTING OF VERT OUTPUT DATA FILES
- 5 - DISPLAY A LISTING OF VERT GRAPHICS DATA FILES
- 6 - DISPLAY A LISTING OF VERT PLOT PREVIEW DATA FILES
- 7 - GET LISTING MENU FOR EDITING THE ABOVE DATA FILES
- R - RETURN TO THE MAIN MENU LEVEL
- END - END THE SESSION

.5 ← I Now Chose to Look at the Data Files Used  
by the Graphics Portion of the Menu Technique  
ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:  
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL  
OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

- 1 >> TEKTRONIX 4014 GRAPHICS TERMINAL
- 2 >> AGILE LINE PRINTER

.2

NOTE:

ON THE TEKTRONIX TERMINAL:  
CHAR 1 - ESC 8 - 31 LINES/PAGE  
CHAR 2 - ESC 9 - 34 LINES/PAGE  
CHAR 3 - ESC : - 54 LINES/PAGE  
CHAR 4 - ESC ; - 60 LINES/PAGE

ON THE AGILE PRINTER:  
MAXIMUM IS 66 LINES/PAGE

ENTER THE NUMBER OF LINES/PAGE DESIRED

.60 ← This Time I Chose to Print 60 Lines Per Page of the Listing  
of the Data Files of the Graphics Portion of the Menu Technique shown on the Next Page  
DO YOU WANT TO STOP AT PAGE BREAKS ( YES OR NO ) ?

.no ← I Chose Not to Stop at Page Breaks

PRM DATA A1 \*TELEGRAF FILE WHICH CONTAINS THE VERT BANKDATA FILES  
(THIS FILE IS CREATED ANEW FOR EACH VERT ONLINE RUN)

PR&1 DATA W1 \*FILES CONTAINING TELEGRAF VERT BANKDATA FILES  
(&1 IS THE SIX MAX ALPHANUMERIC CHARACTER VERT INPUT  
FILENAME ENTERED WHEN A VERT OFFLINE RUN IS MADE. THESE  
FILES ARE CREATED ANEW FOR EACH OFFLINE RUN SESSION)

TAGPRO DATA A1 \*TELEGRAF HOUSEKEEPING FILE FOR DISPLAYING GRAPHS

TAGPRO 4014 A1 \*REPLACES TAGPRO DATA A1 WITH THIS FILE FOR BLACK &  
WHITE GRAPHS

TAGPRO 4027 A1 \*REPLACES TAGPRO DATA A1 WITH THIS FILE FOR COLOR GRAPHS

TAGTRA DATA A1 \*TELEGRAF OUTPUT FILE CONTAINING A LISTING OF THE TELEGRAF  
ACTIONS REQUIRED TO DISPLAY A GRAPH

TEMPORAY DATA A1 \*SCRATCH FILE USED BY VERTGRF1 EXEC A1

TEMPORAY DATA W1 \*SCRATCH FILE USED BY VERTGRF1 EXEC A1

VBANKNAM DATA A1 \*TEMPORARY FILE WHICH HOLDS THE VERT BANKDATA FILENAMES  
(THIS FILE IS CREATED ANEW FOR EACH ONLINE RUN)

VB&1 DATA W1 \*TEMPORARY FILES WHICH HOLD VERT BANKDATA FILENAMES  
(&1 IS THE SIX MAX ALPHANUMERIC CHARACTER VERT INPUT  
FILENAME ENTERED WHEN A VERT OFFLINE RUN SESSION IS  
MADE. THESE FILES ARE CREATED ANEW FOR EACH SESSION)

VTITLE DATA A1 \*SCRATCH FILE USED TO HOLD THE GRAPH TITLE AND X AXIS  
TITLE FOR EACH GRAPH DISPLAYED VIA AN ONLINE RUN  
(THIS FILE IS CREATED ANEW FOR EACH GRAPH DISPLAYED)

VTITLE DATA W1 \*SCRATCH FILE USED TO HOLD THE GRAPH TITLE AND X AXIS  
TITLE FOR EACH GRAPH DISPLAYED VIA AN OFFLINE RUN  
(THIS FILE IS CREATED ANEW FOR EACH GRAPH DISPLAYED)

VERTTELE DATA A1 \*HOLDS THE SKELETAL DATA FOR GENERATING A VERT GRAPH  
CREATED FROM A VERT ONLINE RUN

VERTTELW DATA W1 \*HOLDS THE SKELETAL DATA FOR GENERATING A VERT GRAPH  
CREATED FROM A VERT OFFLINE RUN

VERTGF5A DATA A1 \*HOLDS GRAPHICS PRINT VECTORS FOR COBRA FACTS TIME GRAPH

VERTG5A DATA A1 \*DATA FILE FOR THE COBRA FACTS TIME GRAPH

VERTGF5B DATA A1 \*HOLDS GRAPHICS PRINT VECTORS FOR COBRA FACTS COST GRAPH

VERTG5B DATA A1 \*DATA FILE FOR THE COBRA FACTS COST GRAPH

VERTGF5C DATA A1 \*HOLDS GRAPHICS PRINT VECTORS FOR COBRA FACTS PERFORMANCE  
GRAPH

VERTG5C DATA A1 \*DATA FILE FOR THE COBRA FACTS PERFORMANCE GRAPH

-EOF-



SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 - DISPLAY A LISTING OF VERT EXECUTIVE PROCEDURES
- 2 - DISPLAY A LISTING OF VERT SOURCE PROGRAMS
- 3 - DISPLAY A LISTING OF VERT INPUT DATA FILES
- 4 - DISPLAY A LISTING OF VERT OUTPUT DATA FILES
- 5 - DISPLAY A LISTING OF VERT GRAPHICS DATA FILES
- 6 - DISPLAY A LISTING OF VERT PLOT PREVIEW DATA FILES
- 7 - GET LISTING MENU FOR EDITING THE ABOVE DATA FILES
- R - RETURN TO THE MAIN MENU LEVEL
- END - END THE SESSION

.r

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 - RUN VERT ONLINE
- 2 - RUN VERT OFFLINE (CMS BATCH)
- 3 - VIEW VERT OUTPUT
- 4 - CREATE A VERT INPUT FILE
- 5 - EDIT AN EXISTING VERT INPUT FILE
- 6 - GET VERT NETWORK PLOT MENU
- 7 - GET VERT GRAPH MENU
- LIST - GET VERT DATASETS DISPLAY LISTING MENU
- END - END THE SESSION

.end

R; ← Back in CMS "READY" mode

.logoff

CONNECT= 00:09:10 VIRTCPU= 000:01.63 TOTCPU= 000:03.82  
LOGOFF AT 07:38:32 CDT FRIDAY 07/23/82

Since I chose Not to Stop at  
Page Breaks, The Data File Was  
Listed and this Menu Displayed  
Before stopping

APPENDIX G

SAMPLE SESSION NUMBER 2:

RUN, PRINT, AND GRAPH USING AN

EXISTING VERT INPUT DATA FILE

(Tektronix 4027 Color Graphics Terminal)

enter class 116622

USACC DATA NUMBERS ARE: AV693-3582 OR 314-263-3582  
class 162 start  
cms6

READY-TO-IBM

S+E VM/SP ONLINE

! ← Depress "RETURN" Button

.log fpkerly

restart

.log fpkerly

ENTER PASSWORD: } Enter userid and password

DASD 196 LINKED R/W; R/O BY FTBACKUP  
LOGON AT 06:19:51 CDT TUESDAY 08/03/82  
MIDWEST S+E COMPUTER CENTER

• ← Depress "RETURN" Button

Y (19E) R/O

CMSZER SYSTEM NAME 'CMSZER' NOT AVAILABLE.

CMSSEG SYSTEM NAME 'CMSSEG' NOT AVAILABLE.

DASD 291 DEFINED

'19E' REPLACES 'Y (19E) '

Y (19E) R/O

E (194) R/O

R; ← CMS "READY" mode

.VERTEX\_ ← Enter the name of the executive file which runs the menu technique.

THIS PAGE DEPICTS LOGGING ON THE COMPUTER TERMINAL (TEKTRONIX 4027 COLOR GRAPHICS TERMINAL) AND GETTING INTO CMS "READY" MODE. UNLESS OTHERWISE STATED ALL PAGES IN THIS SESSION WERE CREATED BY MANUALLY DEPRESSING THE "ERASE" BUTTON ON THE COMPUTER TERMINAL. EACH PAGE IS AN ACTUAL PICTURE OF THE COMPUTER GRAPHICS TERMINAL CRT SCREEN.

APPENDIX G

SAMPLE SESSION NUMBER 2:

RUN, PRINT, AND GRAPH USING AN

EXISTING VERT INPUT DATA FILE

(Tektronix 4027 Color Graphics Terminal)

|          |       |    |
|----------|-------|----|
| TAGPRO   | DATA  | A1 |
| TAGPRO   | 4014  | A1 |
| TAGPRO   | 4027  | A1 |
| VOUTPUT  | AAAA  | A1 |
| VERT1    | AAAA  | A1 |
| VERT2    | AAAA  | A1 |
| VERT3    | AAAA  | A1 |
| VERT4    | AAAA  | A1 |
| VERTNEW  | BATCH | A1 |
| VERTNEW1 | BATCH | A1 |
| VBANKNAM | DATA  | A1 |
| VBANKNM1 | DATA  | A1 |
| VERTBAT  | DATA  | A1 |
| VERTGF5A | DATA  | A1 |
| VERTGF5B | DATA  | A1 |
| VERTGF5C | DATA  | A1 |
| VERTG5A  | DATA  | A1 |
| VERTG5B  | DATA  | A1 |
| VERTG5C  | DATA  | A1 |
| VERTIND1 | DATA  | A1 |
| VERTIND2 | DATA  | A1 |
| VERTIND3 | DATA  | A1 |
| VERTIND4 | DATA  | A1 |
| VERTIND5 | DATA  | A1 |
| VERTIND6 | DATA  | A1 |
| VERTTELE | DATA  | A1 |
| VICO30P1 | DATA  | A1 |
| VILTUGN0 | DATA  | A1 |
| VILTUGN1 | DATA  | A1 |
| VPECPT2R | DATA  | A1 |
| VPLTUGN1 | DATA  | A1 |
| VTITLE   | DATA  | A1 |
| VERTBAT  | EXEC  | A1 |
| VERTEDIT | EXEC  | A1 |

E (194) R/O

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1    =   RUN VERT ONLINE
- 2    =   RUN VERT OFFLINE (CMS BATCH)
- 3    =   VIEW VERT OUTPUT
- 4    =   CREATE A VERT INPUT FILE
- 5    =   EDIT AN EXISTING VERT INPUT FILE
- 6    =   GET VERT NETWORK PLOT MENU
- 7    =   GET VERT GRAPH MENU
- LIST =   GET VERT DATASETS DISPLAY LISTING MENU
- END   =   END THE SESSION

.5\_ ← Item 5 is selected

ENTER FILENAME OF VERT INPUT FILE TO BE EDITED

.VILTUGN1 ← Large Tug NDI (Revised) Schedule VERT input data file

EDIT:

TOF:

./ENDARC ← Find the end of the arc records

ENDARC

./AWDPROD ← Find the First Node to be selected for "camera-ready" graphs.

AWDPROD 2 2

AWARD PRODUCTION CONTRACT

.ZONE 13 14

.C / 16 / } Change Columns 13 and 14 of the "AWDPROD" Node record from blanks to "16".

AWDPROD 2 216

AWARD PRODUCTION CONTRACT

.ZONE 15 16

.C / 1 / } Since "AWDPROD" is not a terminal node, a sequence number (in this case "1") is required in columns 15 and 16 of the record.

AWDPROD 2 216 1

AWARD PRODUCTION CONTRACT

.ZONE 1 80

← Reset the zone to its normal setting

./DELC

← Find the second node to be selected for "camera-ready" graphs.

DELCRF1 2 2

DELIVER CRAFT 1

.ZONE 13 14

.C / 16 / } Change Columns 13 and 14 of the "DELCRF1" node record from blanks to "16".

DELCRF1 2 216

DELIVER CRAFT 1

.\_



ZONE 15 16 } Since "DELCRF1" is not a terminal node either, sequence  
 .C / 2/ } Number "2" is placed in Columns 15 and 16 of the record

DELCRF1 2 216 2 DELIVER CRAFT 1

.ZONE 1 88 ← Reset Zone

. / IOC / ← Find Node "IOC" (First occurrence of phrase "Ioc")

IOCLEAD 4 2 DUMMY NODE TO GET TO IOC

. = ← Wrong Node

IOC 2 1 INITIAL OPERATIONAL CAPABILITY

.ZONE 13 14 } Find Node "IOC" Again (Second occurrence)

.C / 16/ } Change Columns 13 and 14 of the "IOC" node record from  
 blanks to "16"

IOC 2 116 INITIAL OPERATIONAL CAPABILITY

.FILE\_

Since IOC is a terminal node (Number "1" in column 12 of the Record) no sequence number is used. "FILE" makes the changes permanent.

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1    =   RUN VERT ONLINE
- 2    =   RUN VERT OFFLINE (CMS BATCH)
- 3    =   VIEW VERT OUTPUT
- 4    =   CREATE A VERT INPUT FILE
- 5    =   EDIT AN EXISTING VERT INPUT FILE
- 6    =   GET VERT NETWORK PLOT MENU
- 7    =   GET VERT GRAPH MENU
- LIST =   GET VERT DATASETS DISPLAY LISTING MENU
- END   =   END THE SESSION

.5\_ ← Another VERT input file is to be edited

ENTER FILENAME OF VERT INPUT FILE TO BE EDITED

.VIC030P1

EDIT:

TOF:

.T2

TOF:

1 4 1

.ENDARC

ENDARC

.30

30 2 3

.ZONE 13 14

.C / 16 /

30 2 316

.ZONE 15 16

.C / 1 /

30 2 316 1

.ZONE 1 80

.SUCC

SUCCESS 2 1

.ZONE 13 14\_

Cobra 30mm Gun Program Alternative 1 Decision  
Risk Analysis (DRA) VERT input data file

Type 2 Records of the File

435459 500 1.0 1.0

500 Monte Carlo iterations will be used for  
the VERT run

Find the end of the arc records

Find Node "30" (System Integration)

Set Node "30" for "camera-ready" graphs

Reset Zone

Find Node "SUCCESS" (Project Completion)

.C /16/ ← Change columns 13 and 14 of the "SUCCESS" node  
SUCCESS 2 116 from blanks to "16". Since "SUCCESS" is a terminal  
.FILE ← node no sequence number is used.  
The changes are made permanent

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

I did not clear the page here because I knew I had enough room on the screen for the menu. To clear the page, Depress the "ERASE" button on your terminal before completing the entry "FILE" above.

.2\_ ← Item 2 is selected.

BATCHDV - DSC

IS BATCHDV "DSC" ? ENTER YES/NO

.yes

DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ? ENTER YES/NO

.yes

ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN

< NO SPACES, 10 CHARACTERS MAX>

.awdprod\$

DO YOU WANT TO ENTER ANOTHER FILENAME

ENTER Y FOR YES OR N FOR NO

.y

ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN

< NO SPACES, 10 CHARACTERS MAX>

.delcrf1\$

DO YOU WANT TO ENTER ANOTHER FILENAME

ENTER Y FOR YES OR N FOR NO

.y

619

← The name selected for the "X" and "Y" data file to hold the histogram data for the First node selected of the Large Tug NDI Schedule VERT input data file. I could have used any name here.

← The second name is selected

ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN  
< NO SPACES, 10 CHARACTERS MAX>

.ioc\$ ← the third name is selected

DO YOU WANT TO ENTER ANOTHER FILENAME  
ENTER Y FOR YES OR N FOR NO

.n ← No more names are selected since only three nodes  
in the Large Tug NDI Schedule VERT input data file  
were originally selected for "camera-ready" graphs.

ENTER THE SIX CHARACTER UNIQUE FILENAME OF THE VERT FILE TO BE RUN

.ltugn1 ← the unique part of a VERT input data file filename.  
Since a CMS filename is restricted to 8 characters maximum, this 6

EDIT: character unique filename is also a maximum.  
Job "00077215" entered in batch system. Less than 6 characters can be entered.

EDIT: ← The job number for this offline run

← Depress the "RETURN" button on your terminal to continue

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

.2\_ ← Another VERT input data file is to be run offline



06:26:41

MSG FROM BATCH01 : VILTUGN1 HAS FINISHED

The First offline run has finished already

CON FILE 0187 FROM BATCH01 COPY 001 NOHOLD  
CON FILE 0188 FROM BATCH01 COPY 001 NOHOLD  
BATCHDV - DSC

IS BATCHDV "DSC" ? ENTER YES/NO

.yes

DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ? ENTER YES/NO

.yes

ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN  
< NO SPACES, 10 CHARCTERS MAX>

.co30time\$

schedule data for Node "30"

DO YOU WANT TO ENTER ANOTHER FILENAME  
ENTER Y FOR YES OR N FOR NO

.y

ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN  
< NO SPACES, 10 CHARCTERS MAX>

.co30pcost\$

path cost data for  
node "30"

The VERT input data file to be run this time is the Cobra 30 mm Gun Program Alternative DRA. Only two nodes were originally selected ("30" and "SUCCESS" for "camera-ready" graphs. However, since this input file includes cost information, 3 "X" and "Y" histogram data files will be required for each node. The first "X" and "Y" data file contains schedule data, the second path cost data, and the third total cost data.

DO YOU WANT TO ENTER ANOTHER FILENAME  
ENTER Y FOR YES OR N FOR NO

.y

ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN  
< NO SPACES, 10 CHARCTERS MAX>

.co30tcost\$ ← total cost data for node "30"

DO YOU WANT TO ENTER ANOTHER FILENAME  
ENTER Y FOR YES OR N FOR NO

.y

ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN  
< NO SPACES, 10 CHARCTERS MAX>

.coendtime\$ ← schedule data for node "SUCCESS"

DO YOU WANT TO ENTER ANOTHER FILENAME  
ENTER Y FOR YES OR N FOR NO

.y

ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN  
< NO SPACES, 10 CHARCTERS MAX>

.coendpcost\$ ← Path cost data for node "SUCCESS"

DO YOU WANT TO ENTER ANOTHER FILENAME

ENTER Y FOR YES OR N FOR NO

.y

ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN

< NO SPACES, 10 CHARCTERS MAX>

.coendtcost\$ ← Total cost Data for node "SUCCESS"

DO YOU WANT TO ENTER ANOTHER FILENAME

ENTER Y FOR YES OR N FOR NO

.n ← No more names are selected

ENTER THE SIX CHARACTER UNIQUE FILENAME OF THE VERT FILE TO BE RUN

.co30p1 ← Cobra 30mm Gun Program Alternative 1 DRA VERT input data file

EDIT:

Job "00078215" entered in batch system.

EDIT:

← the job number for this offline run

← Depress the "RETURN" button on your terminal to continue

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1     =   RUN VERT ONLINE
- 2     =   RUN VERT OFFLINE (CMS BATCH)
- 3     =   VIEW VERT OUTPUT
- 4     =   CREATE A VERT INPUT FILE
- 5     =   EDIT AN EXISTING VERT INPUT FILE
- 6     =   GET VERT NETWORK PLOT MENU
- 7     =   GET VERT GRAPH MENU
- LIST   =   GET VERT DATASETS DISPLAY LISTING MENU
- END    =   END THE SESSION

.3\_ ← Item 3 is selected

DID YOU RUN VERT ONLINE ?  
 ENTER YES/NO  
 .no

HAVE YOU RECEIVED NOTICE THAT YOUR LAST CMS BATCH JOB SUBMITTED  
 HAS COMPLETED ? ENTER YES/NO

.no ← A "NO" is entered since the "VIC030P1" run has not finished.

DO YOU WANT TO FIND OUT IF ANY OF YOUR VERT OFFLINE  
 JOB ( S ) HAVE FINISHED ? ENTER YES/NO  
 .yes

The "VIC030P1" run is executing (ACT = ACTIVE).

The "VILTUGN1" run previously submitted has completed (CMP = COMPLETED).

BATQUR283I Performing query for userid "FPKERLY"

| Usrident | Sysident | Status | Last activity     | Machine | Output sent to |
|----------|----------|--------|-------------------|---------|----------------|
| VERTNEW1 | 00078215 | ACT    | 08/03/82 06:29:34 | BATCH01 | * *            |
| VERTNEW1 | 00077215 | CMP    | 08/03/82 06:26:43 | BATCH01 | * *            |
| VERTNEW1 | 00055214 | CMP    | 08/02/82 12:26:00 | BATCH02 | * *            |
| VERTNEW1 | 00054214 | CMP    | 08/02/82 12:20:54 | BATCH01 | * *            |
| VERTNEW1 | 00053214 | CMP    | 08/02/82 11:55:03 | BATCH01 | * *            |
| VERTNEW1 | 00052214 | CMP    | 08/02/82 11:41:10 | BATCH01 | * *            |
| VERTNEW1 | 00051214 | CMP    | 08/02/82 11:39:14 | BATCH01 | * *            |
| VERTNEW1 | 00040211 | CMP    | 07/30/82 12:43:01 | BATCH01 | * *            |
| VERTNEW1 | 00039211 | CMP    | 07/30/82 12:27:45 | BATCH01 | * *            |
| VERTNEW1 | 00038211 | CMP    | 07/30/82 10:46:13 | BATCH01 | * *            |
| VERTNEW1 | 00037211 | CMP    | 07/30/82 10:33:16 | BATCH01 | * *            |
| VERTNEW1 | 00036211 | CMP    | 07/30/82 10:23:40 | BATCH01 | * *            |
| VERTNEW1 | 00035211 | CMP    | 07/30/82 10:15:21 | BATCH01 | * *            |
| VERTNEW1 | 00034211 | CMP    | 07/30/82 10:14:52 | BATCH01 | * *            |
| VERTNEW1 | 00033211 | CMP    | 07/30/82 09:41:51 | BATCH01 | * *            |

|          |          |     |          |          |         |   |   |
|----------|----------|-----|----------|----------|---------|---|---|
| VERTNEW1 | 00032211 | CMP | 07/30/82 | 09:06:51 | BATCH02 | * | * |
| VERTNEW1 | 00031211 | CMP | 07/30/82 | 09:06:27 | BATCH01 | * | * |
| VERTNEW1 | 00030211 | CMP | 07/30/82 | 08:47:05 | BATCH01 | * | * |
| VERTNEW1 | 00029211 | CMP | 07/30/82 | 08:41:15 | BATCH01 | * | * |
| VERTNEW1 | 00028211 | CMP | 07/30/82 | 08:34:43 | BATCH01 | * | * |
| VERTNEW  | 00026210 | CMP | 07/29/82 | 15:11:23 | BATCH01 | * | * |
| VERTNEW  | 00025210 | CMP | 07/29/82 | 14:49:25 | BATCH01 | * | * |
| VERTNEW1 | 00021210 | CMP | 07/29/82 | 13:32:17 | BATCH01 | * | * |
| VERTNEW  | 00020210 | CMP | 07/29/82 | 13:24:48 | BATCH01 | * | * |
| VERTNEW1 | 00019210 | CMP | 07/29/82 | 13:08:21 | BATCH02 | * | * |
| VERTNEW  | 00018210 | CMP | 07/29/82 | 13:07:39 | BATCH01 | * | * |
| VERTNEW  | 00017210 | CMP | 07/29/82 | 12:44:01 | BATCH01 | * | * |
| VERTNEW1 | 00016210 | CMP | 07/29/82 | 12:42:22 | BATCH01 | * | * |
| VERTNEW  | 00011209 | CMP | 07/28/82 | 14:37:05 | BATCH01 | * | * |

HAS ALL OF YOUR OFFLINE JOBS FINISHED ?

ENTER YES/NO

.no ← A "NO" is entered since the "VIC030P1" run has not yet finished.

MSG FROM BATCH01 : VIC030P1 HAS FINISHED ← the "VIC030P1" run just finished

CON FILE 0192 FROM BATCH01 COPY 001 NOHOLD

CON FILE 0193 FROM BATCH01 COPY 001 NOHOLD

YOU CAN'T ACCESS AN OUTPUT FILE UNTIL ALL FILES HAVE BEEN CREATED FROM CMS BATCH !

HOWEVER YOU MAY PRINT OUT A FILE THAT HAS ALREADY BEEN CREATED

ENTER YES/NO IF YOU WANT A FILE PRINTED

Since I entered "NO" above, I am not allowed to view the output from the "VILTUGN1" run. This is a safeguard to prevent me from damaging my 194 W disk.

.no ← I do not want a printout of the "VILTUGN1"  
Output file at this time.  
E (194) R/O

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

← Depressing the "ERASE" button on the Tektronix 4027 Color Graphics Terminal before completing the entry "NO" above will place the menu on a separate page.

.3\_

← The output file from the "VILTUGN1" run is to be viewed.



DID YOU RUN VERT ONLINE ?

ENTER YES/NO

.no

HAVE YOU RECEIVED NOTICE THAT YOUR LAST CMS BATCH JOB SUBMITTED  
HAS COMPLETED ? ENTER YES/NO

.yes ← A "YES" is now entered since the "VIC030P1" run  
has finished.

'194 E/A' RELEASED

ENTER THE VERT OUTPUT FILE YOU WANT TO ACCESS

ENTER FILENAME ONLY

.voltugn1 ←

EDIT:

TOF:

EDIT:

.t17\_ ←

The full name of the output file is entered

Type 17

TOF:

1AWC DRA REVISED NDI LARGE TUG PROGRAM

0PROBLEM IDENTIFICATION CARD OPTION

0TYPE OF INPUT OPTION

0TYPE OF OUTPUT OPTION

0COSTING AND PRUNING OPTION

0FULL PRINT TRIP OPTION

0CORRELATION COMPUTATION AND PLOT OPTION

0COST-PERFORMANCE TIME INTERVAL OPTION

0COMPOSITE TERMINAL NODE MINIMUMS AND MAXIMUMS OPTION

0MEAN PRINT ORDER

0INITIAL SEED

0NUMBER OF ITERATIONS

0YEARLY INTEREST RATE USED FOR INFLATION ADJUSTMENTS

0YEARLY INTEREST RATE USED FOR PRESENT VALUE DISCOUNTING

0TIME FACTOR WHICH CONVERTS PROGRAM TIME TO A YEARLY BASE

0

0

.b

0FULL-REL

2321.0044

222

.quit\_

To get out of the output file

name of the VERT Input Data File

1

0

4

0

0

0

1

0

1

435459

250

0.0

0.0

0.0

The mean composite  
node times option  
was selected250 Monte  
Carlo Iterations  
were used

The Node "FULL-REL" (FULL RELEASE) will take on the average 2321 days to be reached from project initiation. This node was reached by the arc path selected 222 out of the total 250 iterations.

ENTER YES/NO FOR ROUTING

.yes

← A hardcopy printout (11"x14") will be made of the "VILTUGNI" run. Pages G-49 through G-72 show this printout.

ENTER THE NUMBER OF COPIES YOU WANT

.1

PRT FILE 0196 TO OSMVT COPY 001 NOHOLD

DO YOU WANT TO ERASE ANY OUTPUT FILES ?

ENTER YES/NO

.yes

FP8ABB IS HASP JOB 8432 ← Job Number of the printout (Remote 4 Batch Printer will be used)

ENTER THE VERT OUTPUT FILE YOU WANT TO ERASE

ENTER FILENAME ONLY

.voltugn1

← the output file just viewed is erased since I do not need it any longer.

DO YOU WANT TO ERASE ANY MORE OUTPUT FILES ?

ENTER YES/NO

.no\_

E (194) R/O

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

.3\_ ← the "VIC030P1" run is to be viewed

DID YOU RUN VERT ONLINE ?  
ENTER YES/NO  
.no

HAVE YOU RECEIVED NOTICE THAT YOUR LAST CMS BATCH JOB SUBMITTED  
HAS COMPLETED ? ENTER YES/NO

.yes

'194 E/A' RELEASED  
ENTER THE VERT OUTPUT FILE YOU WANT TO ACCESS

ENTER FILENAME ONLY

.voco30p1

EDIT:

TOF:

EDIT:

.t17\_

← 17 Records of the output file from the  
"VIC030P1" Run is to be listed

TOF:

1COBRA-30MM PROGRAM-PROGRAM ALTERNATIVE 1

0PROBLEM IDENTIFICATION CARD OPTION\_\_\_\_\_

0TYPE OF INPUT OPTION\_\_\_\_\_

0TYPE OF OUTPUT OPTION\_\_\_\_\_

0COSTING AND PRUNING OPTION\_\_\_\_\_

0FULL PRINT TRIP OPTION\_\_\_\_\_

0CORRELATION COMPUTATION AND PLOT OPTION\_\_\_\_\_

0COST-PERFORMANCE TIME INTERVAL OPTION\_\_\_\_\_

0COMPOSITE TERMINAL NODE MINIMUMS AND MAXIMUMS OPTION\_\_\_\_\_

0MEAN PRINT ORDER\_\_\_\_\_

0INITIAL SEED\_\_\_\_\_

0NUMBER OF ITERATIONS\_\_\_\_\_

0YEARLY INTEREST RATE USED FOR INFLATION ADJUSTMENTS\_\_\_\_\_

0YEARLY INTEREST RATE USED FOR PRESENT VALUE DISCOUNTING\_\_\_\_\_

0TIME FACTOR WHICH CONVERTS PROGRAM TIME TO A YEARLY BASE\_\_\_\_\_

0

TIME

COST

PERF

.b ← Go to the bottom of the file

0 LAST RANDOM NUMBER SEED = 302426683

.quit\_

get out of the output file

last record in the file since  
the mean print option was  
not selected

|        |                                   |
|--------|-----------------------------------|
| 1      |                                   |
| 0      |                                   |
| 4      |                                   |
| 0      |                                   |
| 0      |                                   |
| 0      |                                   |
| 0      |                                   |
| 1      |                                   |
| 0      |                                   |
| 0      | ← mean print opt.<br>not selected |
| 435459 |                                   |
| 500    | ← 500 iterations<br>selected      |
| 0.0    |                                   |
| 0.0    |                                   |
| 0.0    |                                   |

ENTER YES/NO FOR ROUTING

.yes ← Pages G-73 through G-100 show this printout.

ENTER THE NUMBER OF COPIES YOU WANT

.1

PRT FILE 0198 TO OSMVT COPY 001 NOHOLD

DO YOU WANT TO ERASE ANY OUTPUT FILES ?

ENTER YES/NO

.yes

ENTER THE VERT OUTPUT FILE YOU WANT TO ERASE

ENTER FILENAME ONLY → the output file is erased since it is no longer needed.

.voco30p1 ←

FP8ABB IS HASP JOB 8435 ← Job number for the printout of the  
DO YOU WANT TO ERASE ANY MORE OUTPUT FILES ? "VICO30P1" Run.

ENTER YES/NO

.no\_



E (194) R/O

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

.7\_

← Item 7 is selected

SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = DISPLAY VERT GRAPHICS DATA FILES USING TELEGRAF BANKDATA FILES
- 2 = CREATE A VERT GRAPHICS DATA FILE
- 3 = EDIT AN EXISTING VERT GRAPHICS DATA FILE
- 4 = DISPLAY A VERT GRAPHICS DATA FILE WHICH WAS CREATED MANUALLY
- 5 = SAMPLE VERT GRAPHS (SCHEDULE, COST, AND PERFORMANCE CHARTS  
FOR THE COBRA FACTS DRA)
- R = RETURN TO THE MAIN MENU LEVEL
- END = END THE SESSION

.1\_

← Camera-Ready Graphs Are to be Displayed for  
the two offline runs just completed.

ARE YOU USING A 4827 COLOR GRAPHICS TERMINAL ? ENTER YES/NO  
.yes

DID YOU RUN VERT ONLINE ? ENTER YES/NO  
.no

HAVE ALL VERT OFFLINE JOBS COMPLETED ? ENTER YES/NO  
.yes

'194 E/A' RELEASED

ENTER THE SIX CHARACTER UNIQUE FILENAME FOR THE VERT JOB RUN

.ltugn1

6 characters max, less than 6 may be entered

EDIT:

TOF:

BANKDATA.

AWDPRODS

the graphs from the Large Tug Run are to be displayed first.

The name of the first graph to be displayed. Compare the following graph with page G-61 of this appendix to see the difference of a "camera-ready" graph.

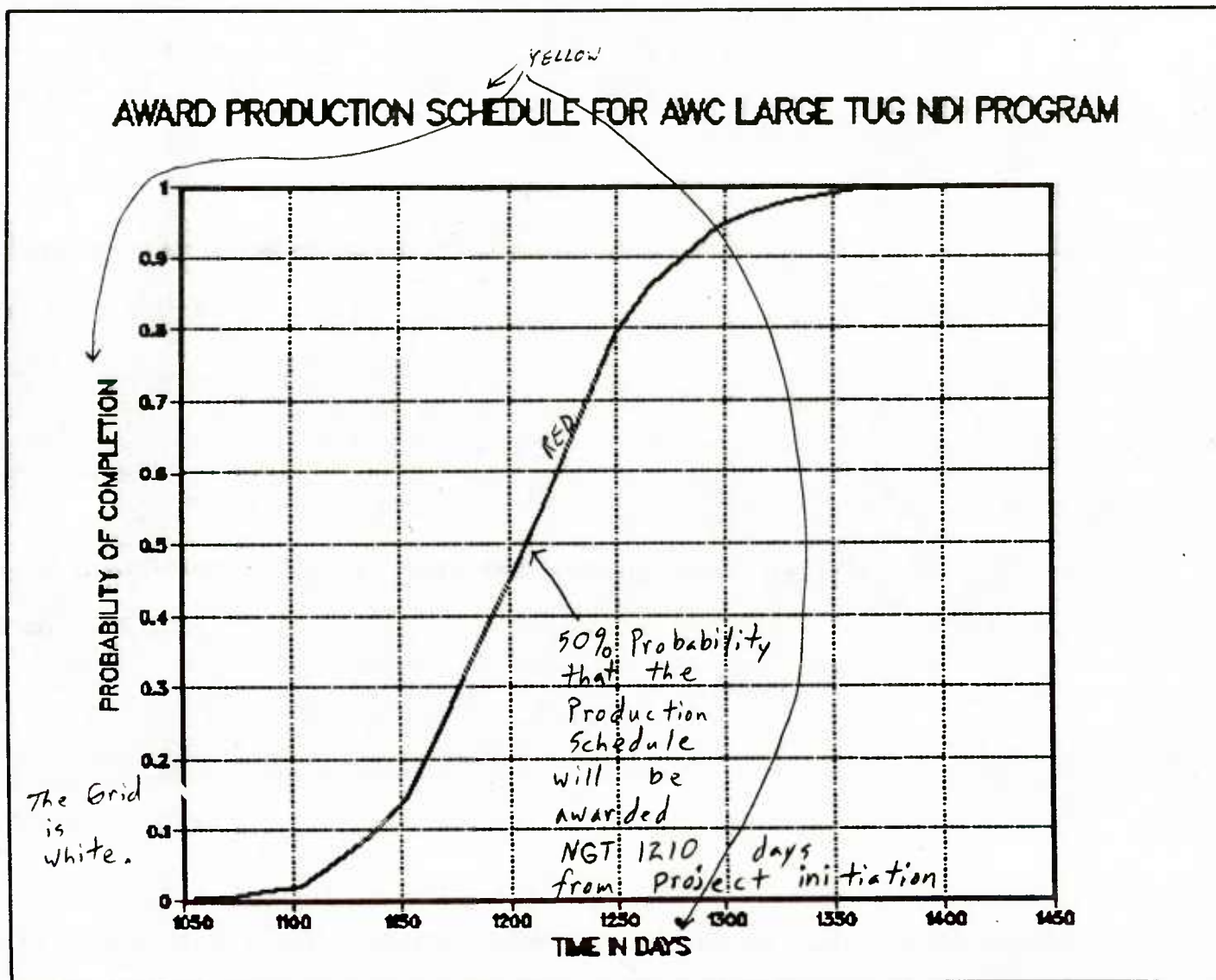
ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>

.'award production schedule for awc large tug ndi program'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>

.'time in days'.

after completing this entry, the CRT screen will be cleared automatically.



Depress "RETURN" button to continue. The CRT screen will be cleared automatically.

END OF TELL-A-GRAF 4.0 — 8188 VECTORS GENERATED IN 1 PLOT FRAMES.  
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.

EDIT:

EDIT:

AWDPROD\$

EDIT:

TOF:

BANKDATA.

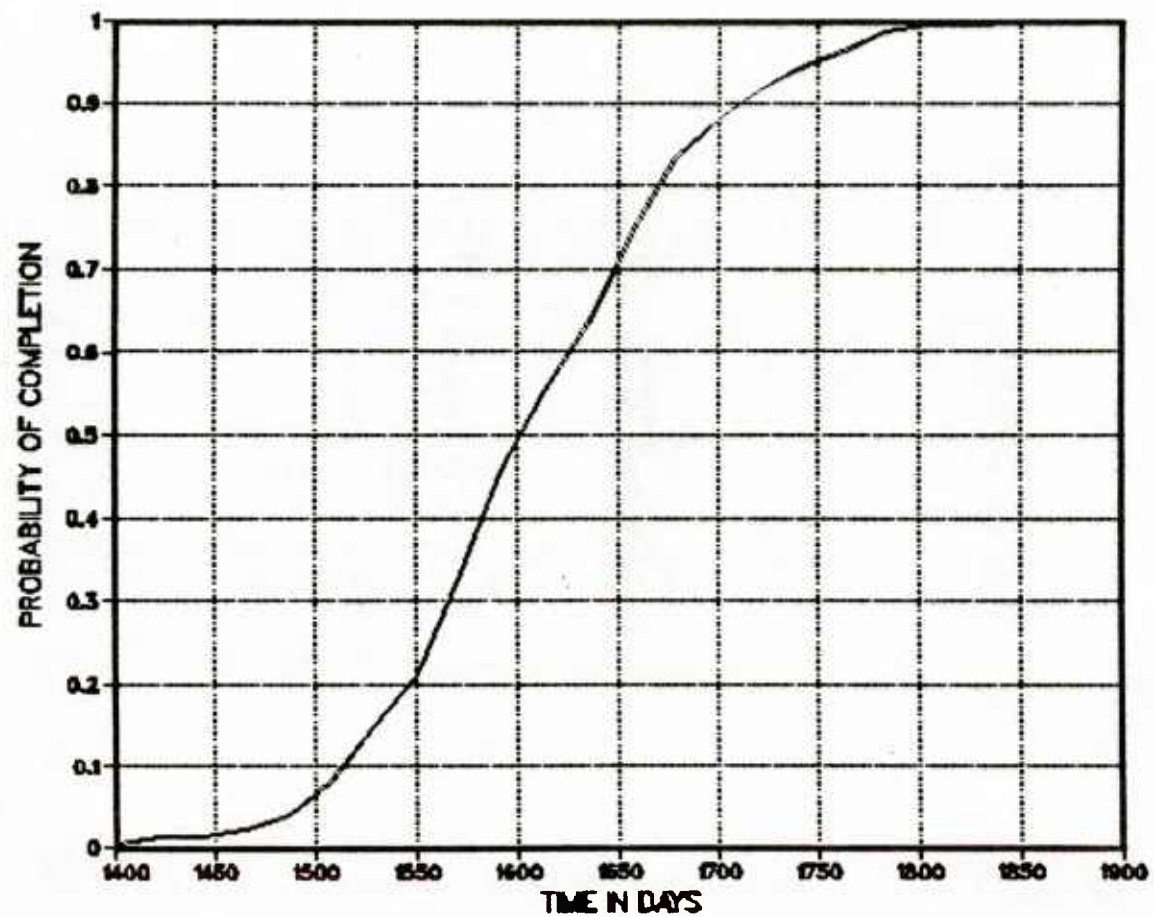
DELCRF1\$

← The second graph to be displayed

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>  
'schedule for delivery of first awc large tug craft'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>  
'time in days'.\_

## SCHEDULE FOR DELIVERY OF FIRST AWC LARGE TUG CRAFT



END OF TELL-A-GRAF 4.0 — 8892 VECTORS GENERATED IN 1 PLOT FRAMES.  
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.

EDIT:  
EDIT:  
DELCRF1\$  
EDIT:  
TOF:  
BANKDATA.  
IOC\$

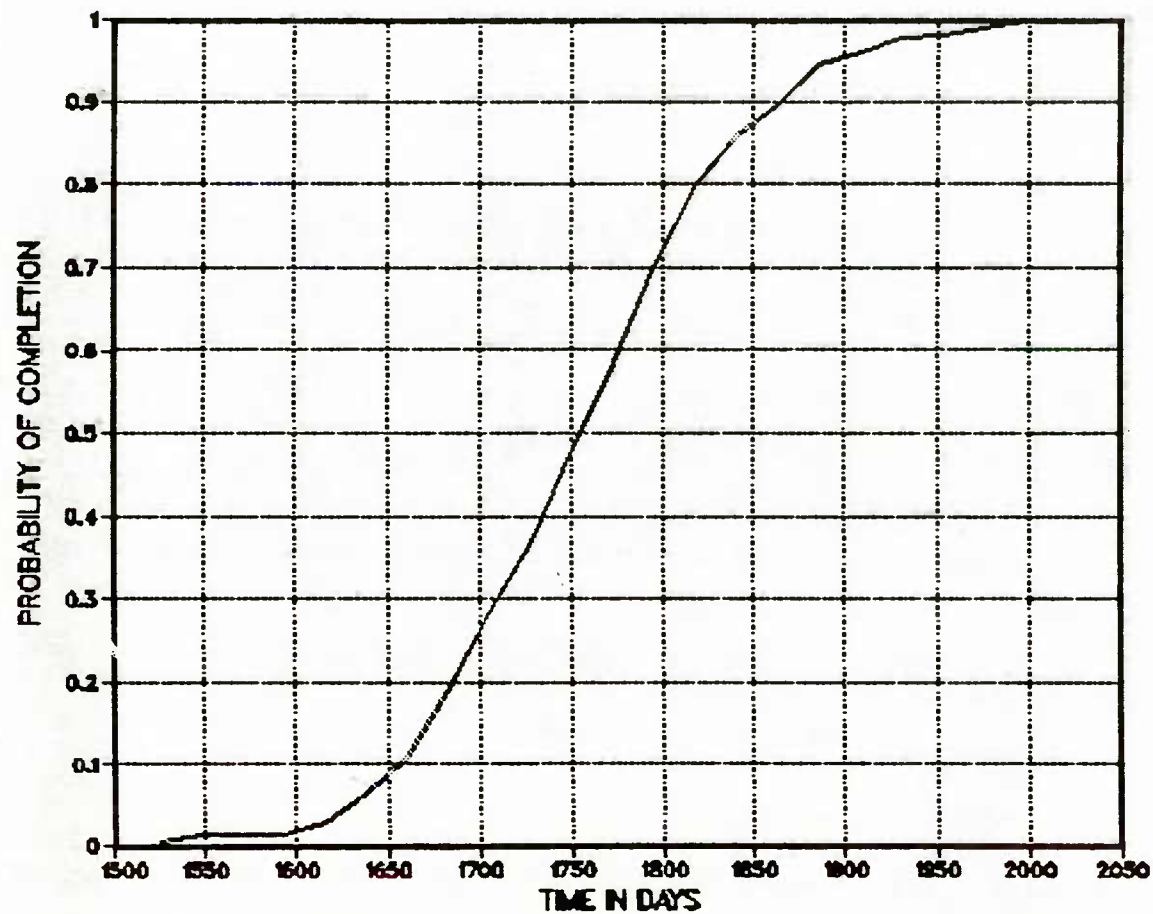
← The third graph to be displayed

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>  
'initial operational capability schedule for awc large tug ndi program'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>  
'time in days'.\_



## INITIAL OPERATIONAL CAPABILITY SCHEDULE FOR AWC LARGE TUG NDI PROGRAM



END OF TELL-A-GRAF 4.0 — 9644 VECTORS GENERATED IN 1 PLOT FRAMES.  
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.

EDIT:

EDIT:

IOC\$

EOF:

INPUT FILE 'VBLTUGN1 DATA W1' NOT FOUND. ← No more graphs to be displayed  
for the "VILTUGN1" Run.

DO YOU WANT TO DISPLAY GRAPHS FOR ANOTHER VERT JOB RUN OFFLINE

ENTER YES/NO

.yes

ENTER THE SIX CHARACTER UNIQUE FILENAME FOR THE VERT JOB RUN

.co30p1\_ ←

The six graphs (3 for each node selected since the  
"VIC030P1" input file contains cost information) for  
the "VIC030P1" RUN are to be displayed.

EDIT:

TOF:

BANKDATA.

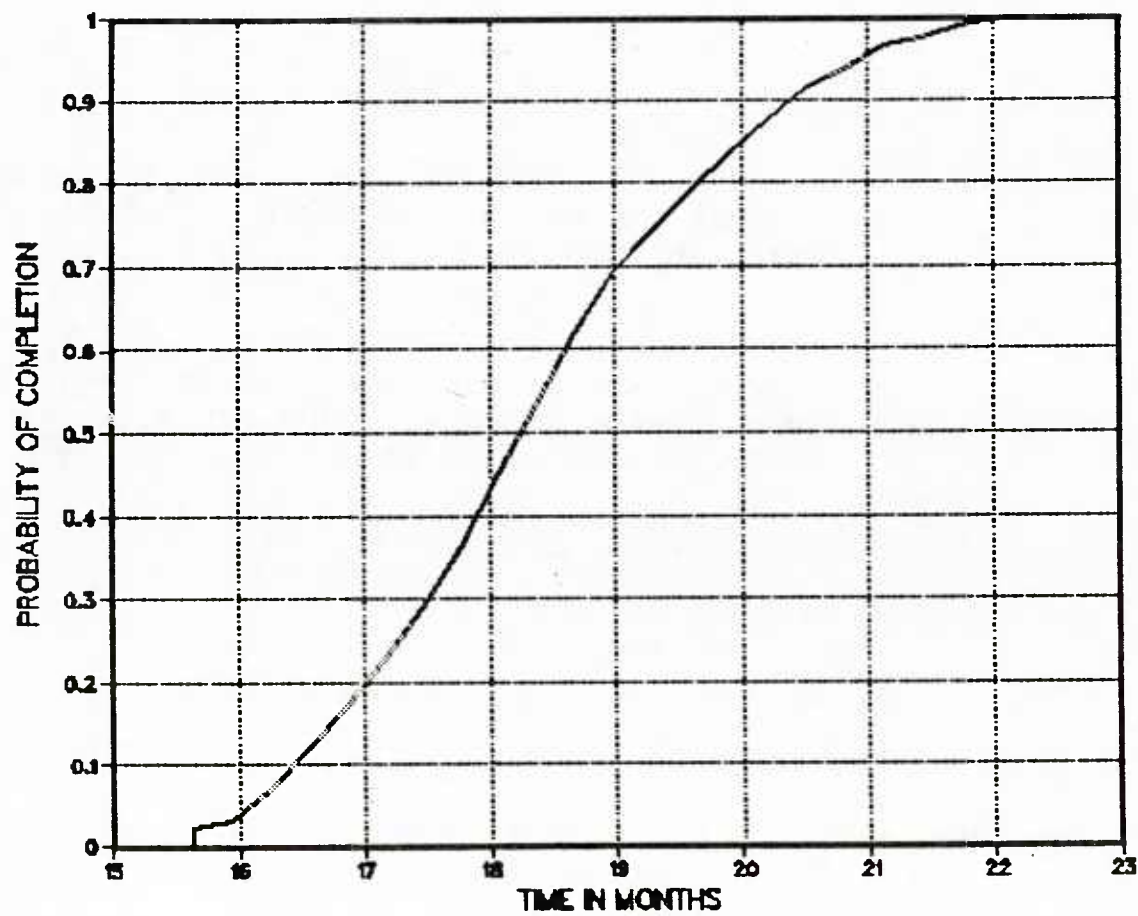
CO30TIMES

← The name of the First Graph to be displayed

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>  
'cobra 30mm system integration dra schedule'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>  
'time in months'.\_

## COBRA 30MM SYSTEM INTEGRATION DRA SCHEDULE



END OF TELL-A-GRAF 4.0 — 7531 VECTORS GENERATED IN 1 PLOT FRAMES.  
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.

EDIT:

EDIT:

CO30TIMES

EDIT:

TOF:

BANKDATA.

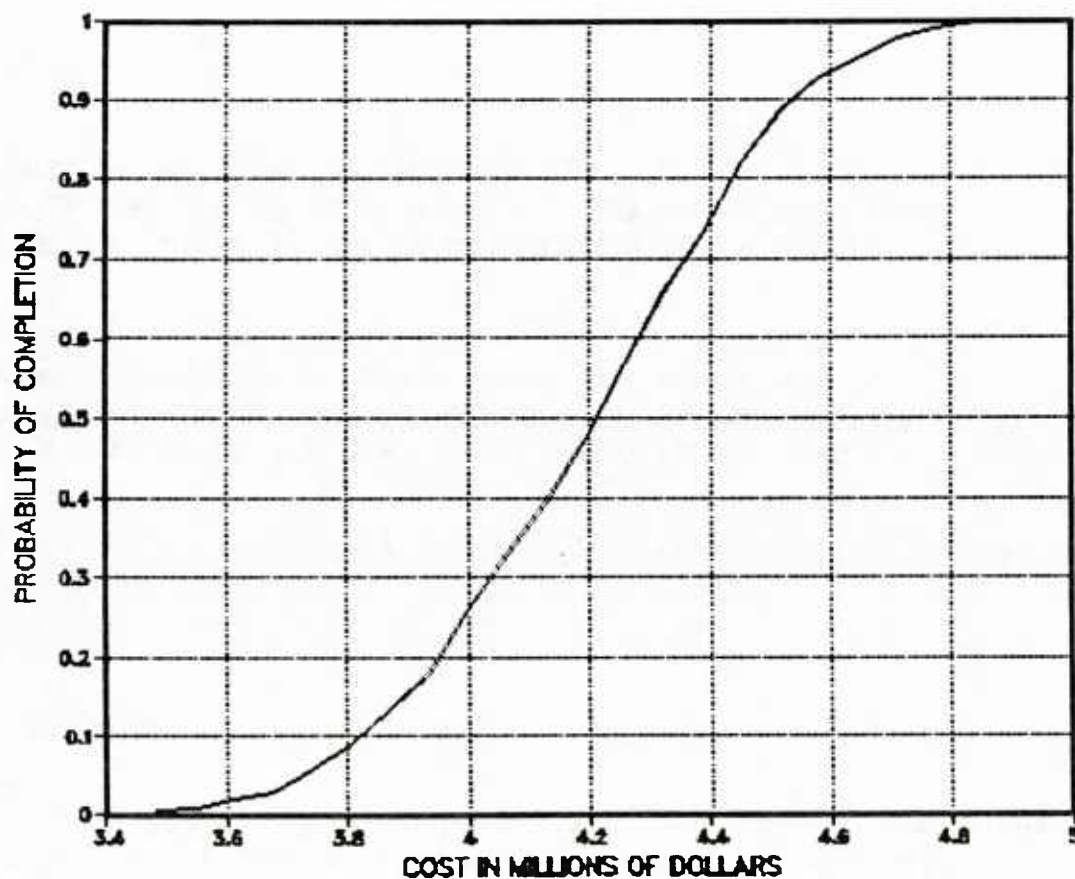
CO30PCOST\$

← The name of the second graph to be displayed

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>  
'cobra 30mm system integration dra path cost'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>  
'cost in millions of dollars'.\_

## COBRA 30MM SYSTEM INTEGRATION DRA PATH COST



The total cost accumulated in processing all the activities on the path(s) through which the network flow(s) had to come in order to process this node

END OF TELL-A-GRAF 4.0 — 7917 VECTORS GENERATED IN 1 PLOT FRAMES.  
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.

EDIT:

EDIT:

C030PCOST\$

EDIT:

TOF:

BANKDATA.

C030TCOST\$

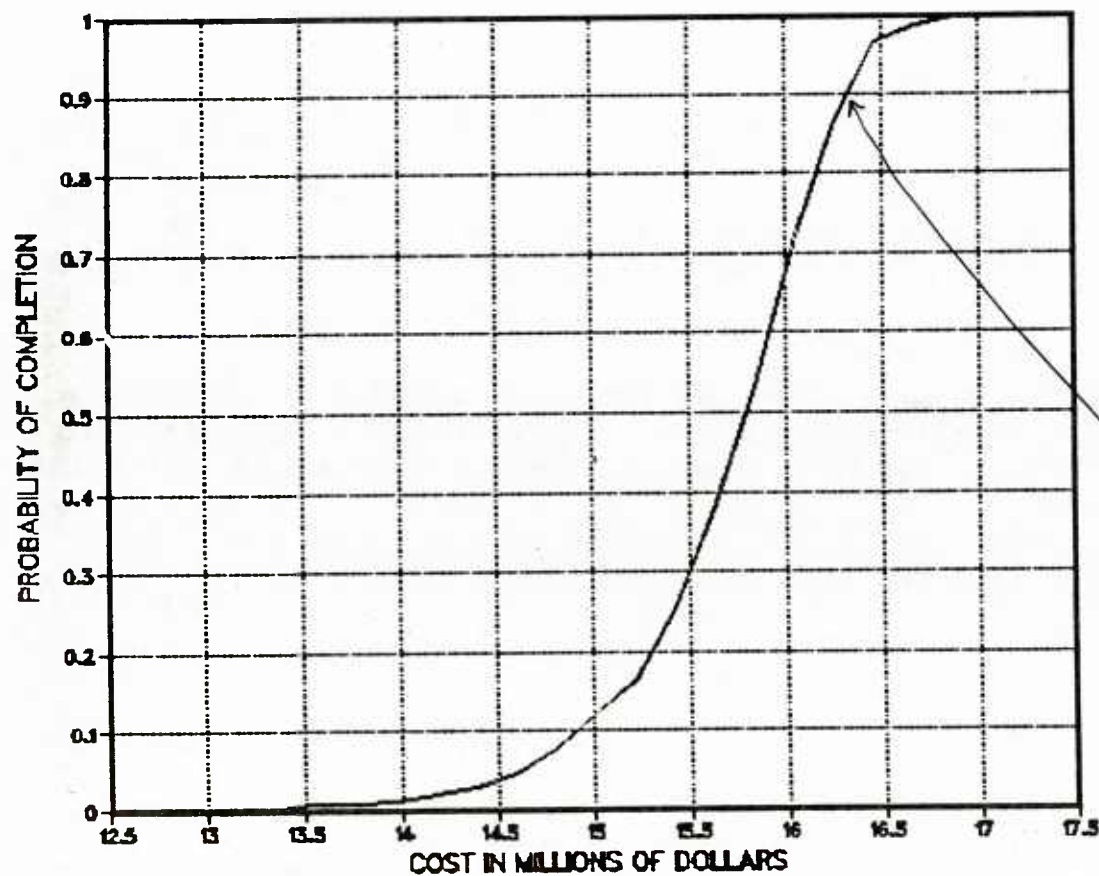
← The third graph to be displayed

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>  
.'cobra 30mm system integration dra total cost'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>  
.'cost in millions of dollars'.\_



# COBRA 30MM SYSTEM INTEGRATION DRA TOTAL COST



The path cost plus the cost of all the other activities processed during and prior to the time this node was processed.

90% Probability that the total cost of the project will exceed 16.4 million dollars up to including system integration.

END OF TELL-A-GRAF 4.0 — 8618 VECTORS GENERATED IN 1 PLOT FRAMES.  
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.

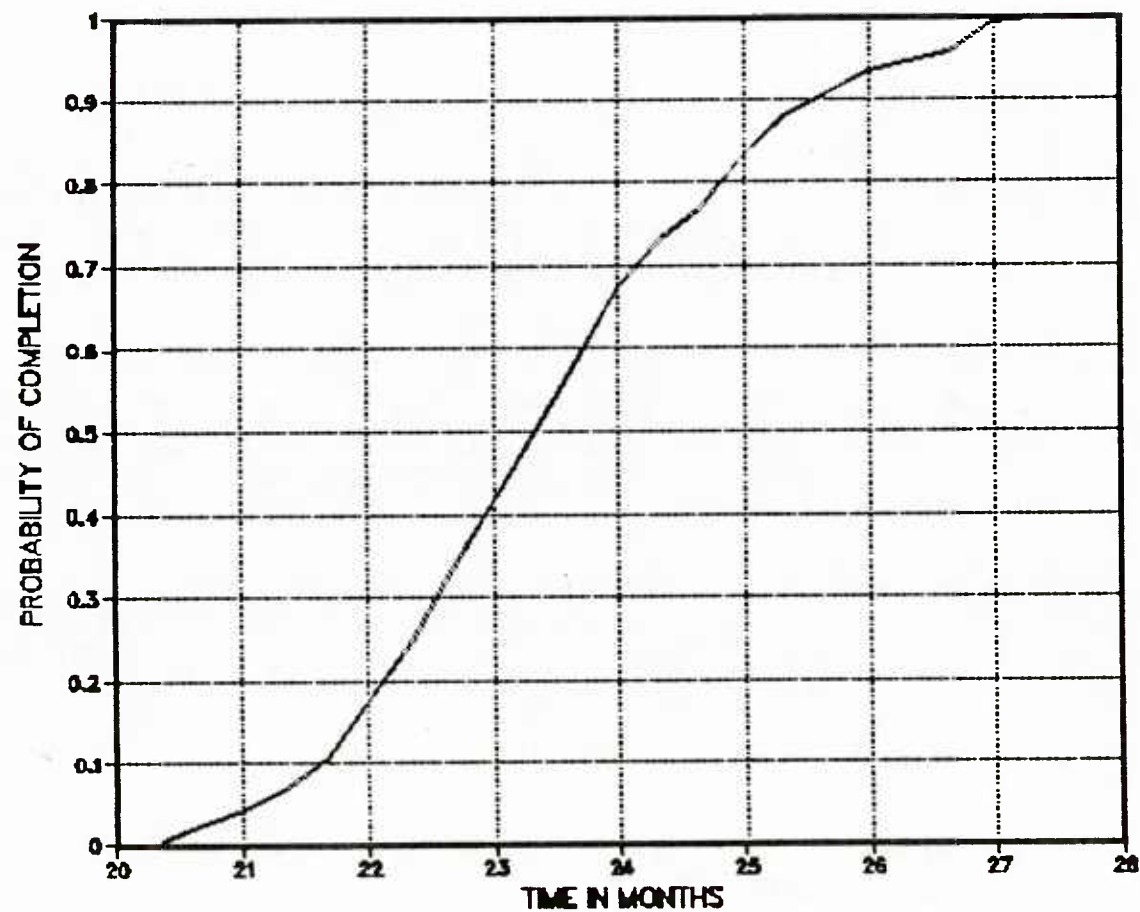
EDIT:  
EDIT:  
CO30TCOST\$  
EDIT:  
TOF:  
BANKDATA.  
COENDTIME\$

← the fourth graph to be displayed

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>  
'dra project completion schedule for cobra 30mm gun '.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>  
'time in months'.\_

## DRA PROJECT COMPLETION SCHEDULE FOR COBRA 30MM GUN



END OF TELL-A-GRAF 4.0 — 7764 VECTORS GENERATED IN 1 PLOT FRAMES.  
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.

EDIT:

EDIT:

COENDTIMES

EDIT:

TOF:

BANKDATA.

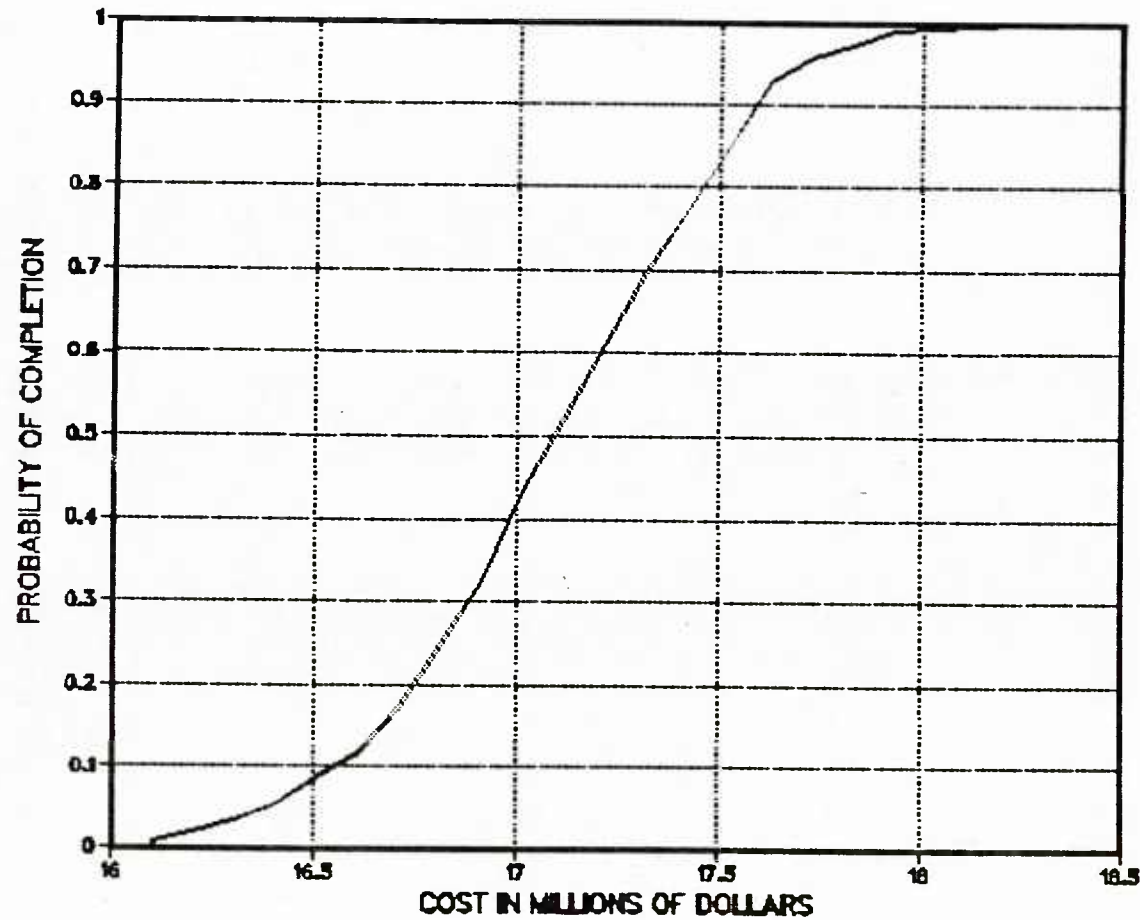
COENDPCOST\$

← The fifth graph to be displayed

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>  
'dra path cost for project completion of cobra 30mm gun'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>  
'cost in millions of dollars'.\_

# DRA PATH COST FOR PROJECT COMPLETION OF COBRA 30MM GUN



END OF TELL-A-GRAF 4.0 — 7256 VECTORS GENERATED IN 1 PLOT FRAMES.  
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.

EDIT:

EDIT:

COENDPCOST\$

EDIT:

TOF:

BANKDATA.

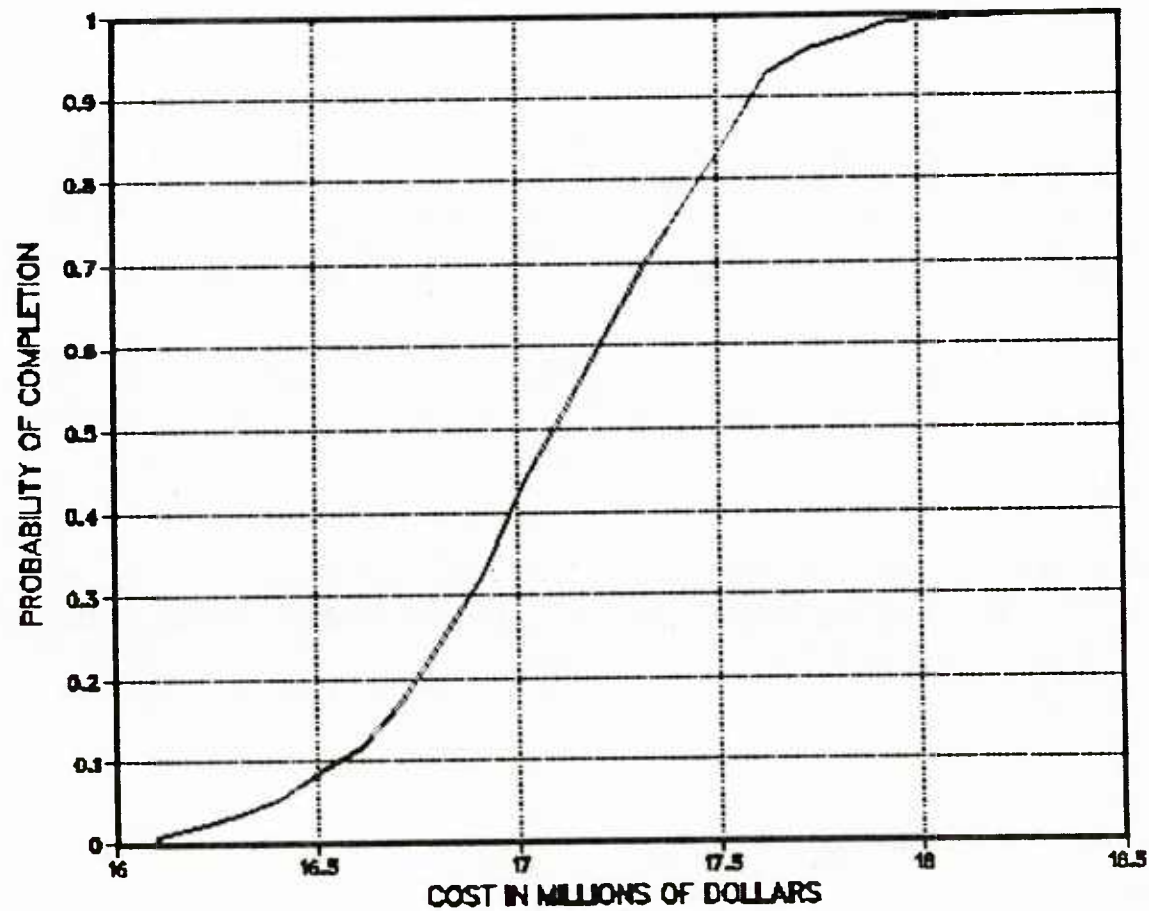
COENDTCOST\$

← The final graph to be displayed

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>  
..'dra total cost for project completion of cobra 30mm gun'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>  
..'cost in millions of dollars'.\_

# DRA TOTAL COST FOR PROJECT COMPLETION OF COBRA 30MM GUN





END OF TELL-A-GRAF 4.0 — 7276 VECTORS GENERATED IN 1 PLOT FRAMES.  
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.

EDIT:

EDIT:

COENDTCOST\$

EOF:

INPUT FILE 'VBC030P1 DATA W1' NOT FOUND. ← No more graphs to be displayed  
for the "VIC030P1" Run

DO YOU WANT TO DISPLAY GRAPHS FOR ANOTHER VERT JOB RUN OFFLINE

ENTER YES/NO

.no\_

← A "NO" is Entered since only 2 offline jobs  
were run

E (194) R/O

SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = DISPLAY VERT GRAPHICS DATA FILES USING TELEGRAF BANKDATA FILES
- 2 = CREATE A VERT GRAPHICS DATA FILE
- 3 = EDIT AN EXISTING VERT GRAPHICS DATA FILE
- 4 = DISPLAY A VERT GRAPHICS DATA FILE WHICH WAS CREATED MANUALLY
- 5 = SAMPLE VERT GRAPHS (SCHEDULE, COST, AND PERFORMANCE CHARTS  
FOR THE COBRA FACTS DRA)
  
- R = RETURN TO THE MAIN MENU LEVEL
  
- END = END THE SESSION

.end

R;

·-

The session is concluded

Back in CMS "READY" mode

AJC DRA REVISED NDI LARGE TUG PROGRAM

PRCBLEM IDENTIFICATION CARD OPTION----- 1  
TYPE CP INFLT OPTIION----- 0  
TYPE CP OUTPUT OPTICN----- 4  
COSTING AND PRUNING OPTION----- 0  
FULL PRINT TRIP OPTION----- 0  
CORRELATION CCMPUTATION AND PLOT OPTICN----- 0  
CCST-PERFORMANCE TIME INTERVAL OPTION----- 1  
CCMFOSITE TERMINAL NODE MINIMLMS AND MAXIMUMS OPTION----- 0  
MEAN PRINT ORDER----- 1  
INITIAL SEED----- 435459  
NUMBER OF ITERATIONS----- 250  
YEARLY INTEREST RATE USED FOR INFLATION ADJUSTMENTS----- 0.0  
YEARLY INTEREST RATE USED FOR PRESENT VALLE DISCOUNTING---- 0.0  
TIME FACTOR WHICH CONVERTS PROGRAM TIME TO A YEARLY BASE--- 0.0

G-49  
TIME COST PERF  
TERMINAL NODE SELECTION WEIGHTS 1.00 0.0 0.0  
CRITICAL - OPTIMUM PATH WEIGHTS 1.00 0.0 0.0  
INITIAL VALUES 0.0 0.0 0.0

COST-PERFORMANCE TIME INTERVAL DATA

0.0 6.0  
6.0 12.0  
12.0 18.0  
18.0 24.0  
24.0 30.0  
0.0 30.0

ENDCTPR

PRSTROC START APPROC 1.00 PREPARE AND STAFF ROC - TRADOC  
PRSTROC DTIME 1 3 150.0 320.0 180.0

LCCRCC START APPROC 1.00 COORDINATE AND ESTAB LOG RGMTS - TSARCOM  
LCCRCC DTIME 1 3 150.0 180.0 170.0

IEPTECOMAPPROC NDIWG1 1.00 PREPARE IEP - TECCM  
IEPTECOMDTIME 1 3 30.0 120.0 60.0

|                |          |              |         |  |                               |
|----------------|----------|--------------|---------|--|-------------------------------|
| IEPTRACCAPPROC | NDIWG1   | 1.00         | PREPARE | IEP - TRADOC                                       |                               |
| IEPTRACCDTIME  | 1        | 3            | 30.0    | 90.0   | 60.0                          |
| MKTSVY         | NDIWG1   | COMPL-MS1.00 | CONDUCT | MARKET SURVEY AND PREPARE                          |                               |
| MKTSVY         | DTIME    | 1            | 3       | 30.0   | 60.0 45.0                     |
| USERSVY        | COMPL-MS | COMPL-US1.00 | CONDUCT | USER SURVEY AND PREPARE REPORT                     |                               |
| USERSVY        | DTIME    | 1            | 3       | 30.0   | 60.0 45.0                     |
| PREFRPT        | COMPL-US | COMPLRPT1.00 | PREPARE | AND COMPLETE MKT/USER SURVEY RESULTS REPORT        |                               |
| PREFRPT        | DTIME    | 1            | 3       | 60.0   | 120.0 90.0                    |
| EVALLOG        | COMPLRPT | PREIPR       | 1.00    | EVALUATE LOGISTICS CONSIDERATIONS                  |                               |
| EVALLOG        | DTIME    | 1            | 3       | 15.0   | 60.0 30.0                     |
| IERTECOM       | COMPLRPT | PREIPR       | 1.00    | PREPARE IER - TECOM                                |                               |
| IERTECOM       | DTIME    | 1            | 3       | 15.0   | 60.0 40.0                     |
| IERTRADCC      | COMPLRPT | PREIPR       | 1.00    | PREPARE IER - TRADOC                               |                               |
| IERTRADCC      | DTIME    | 1            | 3       | 15.0   | 120.0 60.0                    |
| PPGGPRI        | APPRCC   | PREIPR       | 1.00    | PREPARE PROVISIONAL GGPRI                          |                               |
| PPGGPRI        | DTIME    | 1            | 3       | 10.0   | 45.0 24.0                     |
| DRAFTPMP       | APPROC   | PREIPR       | 1.00    | PREPARE DRAFT ACQUISITION PLAN                     |                               |
| DRAFTPMP       | DTIME    | 1            | 3       | 90.0   | 210.0 120.0                   |
| DRAFTMAC       | APPROC   | PREIPR       | 1.00    | PREPARE DRAFT MACI PROGRAM PLAN                    |                               |
| DRAFTMAC       | DTIME    | 1            | 3       | 45.0   | 120.0 60.0                    |
| C&E            | CHART    | APPRCC       | C&EEST  | 1.00   | C&E EVALUATION TEAM CHARTERED |
| C&E            | CHART    | DTIME        | 1       | 3  | 30.0 120.0 60.0               |
| CEEVALPLC      | C&EEST   | INITCESY     | 1.00    | COMPLETE COMMUNICATION ELECTRONICS EVALUATION PLAN |                               |
| CEEVALPLD      | TIME     | 1            | 3       | 5.0  | 30.0 10.0                     |
| C&ESVY         | INITCESY | COMPL-CE     | 1.00    | PERFORM C&E EVALUATION SURVEY                      |                               |
| C&ESVY         | DTIME    | 1            | 3       | 60.0   | 120.0 90.0                    |
| C&ERPT         | COMPL-CE | STARTNDI     | 1.00    | PREPARE AND COMPLETE C&E SURVEY REPORT             |                               |
| C&ERPT         | DTIME    | 1            | 3       | 15.0   | 60.0 30.0                     |
| R&DFRCG        | MADP-I   | STARTR&D     | 1.00    | PREPARE FOR R&D PROGRAM                            |                               |
| R&DFRCG        | DTIME    | 1            | 1       | 30.0   |                               |
| R&DFRCG        | MTIME    | 1            | 0.05    |  | 815                           |
| MACIPROG       | MADP-I   | STARTMAC     | 1.00    | PREPARE FOR MACI PROGRAM                           |                               |
| MACIPROG       | DTIME    | 1            | 1       | 30.0   |                               |
| MACIPROG       | MTIME    | 1            | 0.05    |  | 815                           |
| NDICECSN       | MADF-I   | STARTNDI     | 1.00    | APPROVE NDI DECISION                               |                               |
| NDICECSN       | DTIME    | 1            | 3       | 15.0   | 45.0 30.0                     |
| NDICECSN       | MTIME    | 1            | 0.90    |  | 815                           |
| IPRPKG         | PREIPR   | MADP-I       | 1.00    | PREPARE AND STAFF IPR PACKAGE                      |                               |
| IPRPKG         | DTIME    | 1            | 3       | 45.0   | 90.0 60.0                     |
| PREFFPD        | STARTNDI | PPINPUT      | 1.00    | PREPARE FUNCTIONAL PURCHASE DESCRIPTION            |                               |
| PREFFPD        | DTIME    | 1            | 3       | 90.0   | 210.0 150.0                   |

|                          |      |  |
|--------------------------|------|--|
| PREFLCR STARTNDIFFINPUT  | 1.00 | PREPARE LOGISTICS DATA REQUIREMENTS              |
| PREFLCR CTIME 1          | 3    | 60.0 90.0 70.0                                   |
| DRAFTPPKPPINPUT MADP-II  | 1.00 | PREPARE DRAFT PROCUREMENT PACKAGE                |
| DRAFTPPKOTIME 1          | 3    | 30.0 60.0 45.0                                   |
| DRFTMP1 STARTNDIMADP-II  | 1.00 | PREPARE INITIAL DRAFT MATERIEL PLAN              |
| DRFTMP1 DTIME 1          | 3    | 50.0 80.0 60.0                                   |
| UPDIERTESTARTNDIMADP-II  | 1.00 | UPDATE IER - TECCM                               |
| UPDIERTEDTIME 1          | 3    | 30.0 90.0 60.0                                   |
| UPCIERTRSTARTNDIMADP-II  | 1.00 | UPDATE IER - TRAJOC                              |
| UPCIERTROTIME 1          | 3    | 30.0 120.0 90.0                                  |
| PREFAFF STARTNDIAPINPUT  | 1.00 | PREPARE ADVANCE PROCUREMENT PLAN                 |
| PREFAPP DTIME 1          | 3    | 90.0 150.0 120.0                                 |
| FINNETPLSTARTNDIAPINPUT  | 1.00 | FINALIZE NET PLAN                                |
| FINNETPLOTIME 1          | 3    | 30.0 90.0 60.0                                   |
| DEPMNTPLSTARTNDIAPINPUT  | 1.00 | FINALIZE DEPOT/CCNTR MAINT SUPPORT PLAN          |
| DEPMNTFLOTIME 1          | 3    | 45.0 90.0 60.0                                   |
| FINFRCPVSTARTNDIAPINPUT  | 1.00 | FINALIZE PROVISIONING PLAN                       |
| FINPROVPDIME 1           | 3    | 60.0 120.0 90.0                                  |
| FINQQPRISTARTNDIMADP-II  | 1.00 | UPDATE AND FINALIZE QQPRI                        |
| FINQQPRIOTIME 1          | 3    | 60.0 180.0 120.0                                 |
| FINAL-APAPINPUT MADP-II  | 1.00 | FINALIZE AP                                      |
| FINAL-APDIME 1           | 3    | 30.0 60.0 45.0                                   |
| DRAFTMFPHADP-II MFPDRAFT | 1.00 | PREPARE CRAFT MATERIEL FIELDING PLAN             |
| DRAFTMFPDIME 1           | 3    | 50.0 80.0 60.0                                   |
| ESTBNETTMADP-II EST-NETT | 1.00 | ESTABLISH NETT                                   |
| ESTNETTDIME 1            | 3    | 120.0 180.0 140.0                                |
| FINFFK MADP-II ISSLERFF  | 1.00 | FINALIZE PROCUREMENT PACKAGE                     |
| FINFFK CTIME 1           | 3    | 120.0 210.0 180.0                                |
| PREFPSLSISSUERFPRECPSLS  | 1.00 | PREPARE PROPCSALS                                |
| PREPPSLSDIME 1           | 3    | 30.0 90.0 60.0                                   |
| EVAL-FFPRECPSLSINIT-NEG  | 1.00 | EVALUATE HARDWARE/SOFTWARE PROPOSALS             |
| EVAL-FFPDIME 1           | 3    | 30.0 90.0 60.0                                   |
| NEG-FF INIT-NEGCOMPLNEG  | 1.00 | COMPLETE FIRM FIXED PRICE CONTRACT NEGOTIATIONS  |
| NEG-FF CTIME 1           | 3    | 24.0 40.0 30.0                                   |
| PRAWDSYCOMPLNEGSVYCOMPL  | 1.00 | COMPLETE PRE-AWARD SURVEY FFP CONTRACT           |
| PRAWDSYDIME 1            | 3    | 24.0 60.0 30.0                                   |
| PRCD-AWDSYCOMPLAWDPROD   | 1.00 | AWARD PRODUCTION FIRM FIXED PRICE (FFP) CONTRACT |
| PRCD-AWDDIME 1           | 3    | 24.0 45.0 30.0                                   |
| EVAL-BCASVYCOMPLAWD-BOA  | 1.00 | EVALUATE BOA PROPCSALS                           |
| EVAL-BCADIME 1           | 3    | 30.0 60.0 45.0                                   |

|                          |      |  |        |        |
|--------------------------|------|--|--------|--------|
| EVAL-CLSSVYCOMPLAWD-CLS  | 1.00 | EVALUATE CLS PROPOSALS                       |        |        |
| EVAL-CLS DTIME 1         | 3    | 30.0   | 60.0   | 45.0   |
| COMPLTMSAWDPROD DUMMY1   | 1.00 | PREPARE COMMERCIAL TMS                       |        |        |
| COMPLTMS DTIME 1         | 3    | 120.0  | 210.0  | 160.0  |
| FABCRF1 AWDPROD DELCRF1  | 1.00 | FABRICATE FIRST CRAFT                        |        |        |
| FABCRF1 DTIME 1          | 3    | 270.0  | 540.0  | 420.0  |
| PROVISNGAWDPROD FULL-REL | 1.00 | ACCOMPLISH FULL PROVISIONING                 |        |        |
| PRCVISNG DTIME 1         | 3    | 720.0  | 1440.0 | 1080.0 |
| ASL/PLL AWD-ROA COMP-ASL | 1.00 | ESTABLISH ASL/PLL                            |        |        |
| ASL/PLL DTIME 1          | 3    | 85.0   | 120.0  | 90.0   |
| ESTABCLSAWD-CLS CLSFAC   | 1.00 | ESTABLISH CLS FACILITY                       |        |        |
| ESTABCLS DTIME 1         | 3    | 100.0  | 180.0  | 140.0  |
| COCRDMFPMFPDRAFTMFPCCDRD | 1.00 | COORDINATE MFP                               |        |        |
| COCRDMFP DTIME 1         | 3    | 90.0   | 120.0  | 90.0   |
| FIN-MFP MFPCOORDMFPCDMP  | 1.00 | PUBLISH MFP                                  |        |        |
| FIN-MFP DTIME 1          | 3    | 80.0   | 120.0  | 90.0   |
| TRNCREW1EST-NETTACPT1    | 1.00 | TRAIN INITIAL CREW                           |        |        |
| TRNCREW1 DTIME 1         | 1    | 10.0   |        |        |
| SUFFLTMS DUMMY1 ACPT-TMS | 1.00 | SUPPLEMENT COMMERCIAL MANUALS (VERIFICATION) |        |        |
| SUFFLTMS DTIME 1         | 3    | 90.0   | 180.0  | 150.0  |
| TMLEAD1 DUMMY1 DELCRF1   | 1.00 | S90-DAY TM LEAD TIME                         |        |        |
| TMLEAD1 DTIME 1          | 1    | 90.0   |        |        |
| TRIALS DELCRF1 TESTCR1   | 1.00 | CONDUCT DOCK/SEA TRIALS                      |        |        |
| TRIALS DTIME 1           | 3    | 10.0   | 30.0   | 15.0   |
| CCRRECTINTESTCR1 ACCPT1  | 1.00 | CORRECT TEST-IDENTIFIED DEFICIENCIES         |        |        |
| CCRRECTIN DTIME 1        | 3    | 0.0  | 90.0   | 30.0   |
| LTRPTTECTESTCR1 ACCPT1   | 1.00 | PREPARE LETTER REPORT - TECOM                |        |        |
| LTRPTTEC DTIME 1         | 3    | 15.0   | 90.0   | 45.0   |
| LTRPTTRATESTCR1 ACCPT1   | 1.00 | PREPARE LETTER REPORT - TRADOC               |        |        |
| LTRFTTRADTIME 1          | 3    | 30.0   | 120.0  | 45.0   |
| ASLLEACTCOMF-ASLACCPT1   | 1.00 | S30-DAY ASL LEAD TIME                        |        |        |
| ASLLEACT DTIME 1         | 1    | 30.0   |        |        |
| CLSLEADTCLSFAC ACCPT1    | 1.00 | S30-DAY CLS LEAD TIME                        |        |        |
| CLSLEADT DTIME 1         | 1    | 30.0   |        |        |
| TMLEAD2 ACPT-TMSCOND-REL | 1.00 | S30-DAY TM LEAD TIME                         |        |        |
| TMLEAC2 DTIME 1          | 1    | 30.0   |        |        |
| REL-LEADACCPT1 CCNC-REL  | 1.00 | PREPARE MATERIEL RELEASE PKG - CONDITIONAL   |        |        |
| REL-LEAD DTIME 1         | 3    | 30.0   | 90.0   | 45.0   |
| MFP-LEADMFPCOMPLIOC      | 1.00 | S6-MONTH LEAD TIME                           |        |        |
| MFP-LEAD DTIME 1         | 1    | 180.0  |        |        |

)  
 ACPTREMACCPT1 FINALDEL1.00 ACCEPT REMAINING CRAFT - QUANTITY DEPENDENT (TWO)  
 , ACPTREMO TIME 1 3 180.0 360.0 270.0  
  
 TAG-TMS ACPT-TMSFULL-REL1.00 PREPARE AUTHENTICATED TAG MANUALS  
 , TAG-TMS O TIME 1 3 120.0 310.0 180.0  
  
 USE-BOA COMP-ASLFULL-REL1.00 UTILIZE BOA - DUMMY ACTIVITY  
 , USE-BOA O TIME 1 1 1.0  
  
 FRELLEADCOND-RELFULL-REL1.00 PREPARE FULL RELEASE PACKAGE  
 , FRELLEAD O TIME 1 3 30.0 90.0 45.0  
  
 IOCLEAD2CONO-RELIOCLEAD 1.00SLEAD TIME FROM COND REL TO IOC - TO FIND SLACK  
 , IOCLEAD2 O TIME 1 1 1.0  
  
 ICCLEAC1FULL-RELIOCLEAD 1.00SLEAD TIME FROM FULL REL TO IOC - TO FIND SLACK  
 , ICCLEAC1 O TIME 1 1 1.0  
  
 LEAD-ICCIOCLEAD IOC 1.00SLOGIC TO PERMIT SHORTEST LEAD TIME FROM FULL/CONREL  
 , LEAD-IOC O TIME 1 1 1.0  
  
 MTSP-FOEACCP1 INIT-FOE1.00 PREPARE MTSP FOR FOE  
 , MTSP-FOE O TIME 1 3 60.0 120.0 70.0  
  
 IEF-FOE STARTIEPINIT-FOE1.00 PREPARE IEP FOR FOE - TRA00C  
 , IEF-FOE O TIME 1 3 90.0 180.0 120.0  
  
 PERF-FOEINIT-FOECOMPLFOE1.00 PERFORM FOE  
 , PERF-FOE O TIME 1 3 30.0 90.0 45.0  
  
 FOE-IER COMPLFOECOMPLIER1.00 PREPARE IER FOR FOE - TRADOC  
 , FCE-IER O TIME 1 3 45.0 90.0 65.0  
  
 STAFFIERCOMPLIERCOORDCNF1.00 STAFF INDEPENDENT EVALUATION REPORT(IER)  
 , STAFFIER O TIME 1 3 50.0 90.0 60.0  
  
 FLDIPRPKCOORDCNFFLDGIPR 1.00 STAFF THE FIELDING IPR PACKAGE  
 , FLDIPRPK O TIME 1 3 75.0 120.0 90.0  
  
 FLRELCOCFLDGIPR FULL-REL1.00 STAFF THE FULL-RELEASE DOCUMENTATION  
 , FLRELCO O TIME 1 3 35.0 75.0 35.0  
  
 ENDARC  
  
 ) START 1 2 START PROGRAM, ROC AND LOGISTICS REQTS  
 ) APPROC 2 2 APPROVE ROC  
 ) NDIWG1 2 2 CONVENE NOI WORKING GROUP  
 ) CCMPFL-MS2 2 COMPLETE MARKET SURVEY  
 ) CCMPFL-US2 2 COMPLETE USER SURVEY  
 ) COMPLRPT2 2 COMPLETE EVALUATION OF FFP CONTRACT PROPOSALS  
 ) PREIPR 2 2 RECEIVE IPR INPUT, START IPR PACKAGE  
 ) MADP-I 2 3 CONVENE MADP-I (IPR)



|                 |   |
|-----------------|---|
| C&EEST 2 2      | COMPLETE COMMUNICATIONS & ELECTRONICS (C&E) CHART |
| INITCESY2 2     | COMPLETE C&E EVALUATION PLANNING                  |
| COMPL-CE2 2     | COMPLETE C&E ACTION FOR C&E REPORT                |
| STARTR&O2 1     | COMMENCE R&O PROGRAM                              |
| STARTACI2 2     | COMMENCE NOI PROGRAM                              |
| STARTMAC2 1     | COMMENCE MACI PROGRAM                             |
| PPINPUT 2 2     | COMPLETE INPLTS TO PROCUREMENT PACKAGE            |
| APINPUT 2 2     | COMPLETE INPUTS TO ACQUISITION PLAN               |
| MADP-II 2 2     | CONVENE MADP-II (IPR)                             |
| ISSLERFP2 2     | ISSUE RFP FOR HARWARE,CLS BOA                     |
| RECFPSLS2 2     | RECEIVE PROPOSALS FROM PROSPECTIVE SUPPLIERS      |
| INIT-NEG2 2     | COMPLETE INITIAL NEGOTIATIONS OF FFP CONTRACT     |
| COMPLNEG2 2     | COMPLETE FINAL NEGOTIATIONS OF FFP CONTRACT       |
| SVYCCMPL2 2     | COMPLETE SURVEY OF FFP CONTRACTOR                 |
| AWDPRCD 2 216 1 | AWARD PRODUCTION CONTRACT                         |
| AWD-BCA 2 2     | AWARD BOA OPTION                                  |
| AWO-CLS 2 2     | AWARD CLS OPTION                                  |
| QUMMY1 2 2      | RECEIVE COMMERCIAL TMS                            |
| MFFCRAFT2 2     | COMPLETE DRAFT MATERIEL FIELDING PLAN             |
| DELCRF1 2 216 2 | DELIVER CRAFT 1                                   |
| EST-NETT2 2     | NEW EQPT/IKPT ESTABLISHED                         |
| CLSFAC 2 2      | CLS FACILITY COMPLETED                            |
| ACPT-TMS2 2     | ACCEPT INTERIM MANUALS (VERIFIED & SUPPLEMENTED)  |
| COMP-ASL2 2     | COMPLETE ASL/PLL                                  |
| TESTCR1 2 2     | DOCK/SEA TRIALS COMPLETED                         |
| ACCPT1 2 2      | ACCEPT FIRST CRAFT                                |
| MFPCOOR02 2     | COORDINATION OF MFP COMPLETE                      |
| MFPCCMPL2 2     | MFP COMPL   |
| CCND-REL2 2     | CONDITIONAL RELEASE                               |
| STARTIEP1 2     | TRADOC START IEP FOR FOE                          |

FULL-REL2 2 FULL RELEASE  
IOCLEAD 4 2 DUMMY NODE TO GET TO IOC  
IOC 2 116 INITIAL OPERATIONAL CAPABILITY  
FINALDEL2 1 FINAL CRAFT DELIVERED  
INIT-FOE2 2 INITIATE FOE  
COMPLFOE2 2 COMPLETE FOE  
COMPLIER2 2 COMPLETE IER FOR FOE  
COCRDCNF2 2 COMPLETE STAFFING OF INDEPENDENT EVALUATION REPORT  
FLDGIFR 2 2 COMPLETE FIELDING IPR PACKAGE FOR FULL RELEASE

ENDNODE

WARNING NO. 6100 PARAMETER = FLRELOOC

WARNING NO. 6135 PARAMETER =

WARNING NO. 6140 PARAMETER =

WARNING NO. 6144 PARAMETER =

WARNING NO. 6166 PARAMETER =

WARNING NO. 6177 PARAMETER =

## SLACK TIME FOR ARC TMLEAD1

|          | CFD    | 0.1   | 0.2   | 0.3   | 0.4   | 0.5   | 0.6   | 0.7   | 0.8   | 0.9   | 1.0 |       |
|----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 21.5085  | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MIN   |
|          | I      |       |       |       |       |       |       |       |       |       |     | 0.0   |
| 21.5085  | I      |       |       |       |       |       |       |       |       |       |     | 0.014 |
|          | I*     |       |       |       |       |       |       |       |       |       |     |       |
| 35.0253  | I      |       |       |       |       |       |       |       |       |       |     | 0.036 |
|          | I**    |       |       |       |       |       |       |       |       |       |     |       |
| 48.5421  | I      |       |       |       |       |       |       |       |       |       |     | 0.072 |
|          | I****  |       |       |       |       |       |       |       |       |       |     |       |
| 62.0589  | I      |       |       |       |       |       |       |       |       |       |     | 0.126 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 75.5757  | I      |       |       |       |       |       |       |       |       |       |     | 0.198 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 89.0925  | I      |       |       |       |       |       |       |       |       |       |     | 0.221 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 102.6093 | I      |       |       |       |       |       |       |       |       |       |     | 0.293 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 116.1260 | I      |       |       |       |       |       |       |       |       |       |     | 0.356 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 129.6428 | I      |       |       |       |       |       |       |       |       |       |     | 0.455 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 143.1596 | I      |       |       |       |       |       |       |       |       |       |     | 0.541 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 156.6764 | I      |       |       |       |       |       |       |       |       |       |     | 0.617 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 170.1932 | I      |       |       |       |       |       |       |       |       |       |     | 0.685 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 183.7100 | I      |       |       |       |       |       |       |       |       |       |     | 0.766 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 197.2267 | I      |       |       |       |       |       |       |       |       |       |     | 0.829 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 210.7435 | I      |       |       |       |       |       |       |       |       |       |     | 0.869 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 224.2603 | I      |       |       |       |       |       |       |       |       |       |     | 0.910 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 237.7771 | I      |       |       |       |       |       |       |       |       |       |     | 0.946 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 251.2939 | I      |       |       |       |       |       |       |       |       |       |     | 0.973 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 264.8105 | I      |       |       |       |       |       |       |       |       |       |     | 0.986 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 278.3271 | I      |       |       |       |       |       |       |       |       |       |     | 0.995 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 291.8437 | I      |       |       |       |       |       |       |       |       |       |     | 0.995 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 305.3604 | I      |       |       |       |       |       |       |       |       |       |     | 1.000 |
|          | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 318.8775 | I      |       |       |       |       |       |       |       |       |       |     | 0.0   |
|          | I      |       |       |       |       |       |       |       |       |       |     |       |
| 318.8779 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MAX   |

|                    |      |            |          |
|--------------------|------|------------|----------|
| NO OBS-----        | 222  | STD ERROR- | 60.9546  |
| COEF OF VARIATION- | 0.40 | MEAN-----  | 151.4569 |
| KURTOSIS (BETA 2)- | 2.35 | MEDIAN---- | 148.8708 |
| PEARSONIAN SKEW--- | 0.20 | MODE-----  | 139.4732 |

## SLACK TIME FOR ARC ASLLEADT

CFC 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0  
 191.5183 I-----I-----I-----I-----I-----I-----I-----I-----I MIN  
 191.5183 I 0.0  
 205.4261 I 0.005  
 219.3339 I 0.009  
 233.2417 I\* 0.023  
 247.1495 I\*\* 0.036  
 261.0571 I\*\*\* 0.045  
 274.9648 I\*\*\*\* 0.108  
 288.8726 I\*\*\*\*\* 0.162  
 302.7803 I\*\*\*\*\* 0.212  
 316.6880 I\*\*\*\*\* 0.311  
 330.5957 I\*\*\*\*\* 0.383  
 344.5034 I\*\*\*\*\* 0.459  
 358.4111 I\*\*\*\*\* 0.541  
 372.3188 I\*\*\*\*\* 0.626  
 386.2266 I\*\*\*\*\* 0.685  
 400.1343 I\*\*\*\*\* 0.739  
 414.0420 I\*\*\*\*\* 0.797  
 427.9497 I\*\*\*\*\* 0.865  
 441.8574 I\*\*\*\*\* 0.896  
 455.7651 I\*\*\*\*\* 0.937  
 469.6729 I\*\*\*\*\* 0.973  
 483.5806 I\*\*\*\*\* 0.991  
 497.4902 I\*\*\*\*\* 1.000  
 497.4902 I-----I-----I-----I-----I-----I-----I-----I-----I MAX

NO OBS----- 222 STD ERROR- 62.7602  
 COEF OF VARIATION- 0.18 MEAN----- 354.4253  
 KURTOSIS (BETA 2)- 2.35 MEDIAN---- 348.9656  
 PEARSONIAN SKEW--- 0.68 MODE----- 311.7793

## SLACK TIME FOR ARC CLSLEADT

127.6682 I-----I-----I-----I-----I-----I-----I-----I-----I-----I MIN  
 127.6682 I 0.0  
 127.6682 I 0.005  
 142.4066 I 0.005  
 157.1450 I 0.014  
 171.8833 I 0.018  
 186.6217 I 0.027  
 201.3601 I 0.081  
 216.0984 I 0.099  
 230.8368 I 0.135  
 245.5752 I 0.221  
 260.3135 I 0.284  
 275.0518 I 0.374  
 289.7900 I 0.482  
 304.5283 I 0.550  
 319.2666 I 0.604  
 334.0049 I 0.698  
 348.7432 I 0.757  
 363.4814 I 0.815  
 378.2197 I 0.887  
 392.9580 I 0.941  
 407.6963 I 0.968  
 422.4346 I 0.995  
 437.1729 I 1.000  
 451.9126 I 0.0  
 451.9126 I-----I-----I-----I-----I-----I-----I-----I-----I-----I MAX

NO O S----- 222 STD ERROR- 62.6817  
 COEF OF VARIATION- 0.20 MEAN----- 311.9775  
 KURTOSIS (BETA 2)- 2.46 MEDIAN---- 305.9614  
 PEARSONIAN SKEW--- 0.28 MODE----- 294.3247

## SLACK TIME FOR ARC TMLEAD2

CFD 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0  
 63.8196 I-----I-----I-----I-----I-----I-----I-----I MIN  
 63.8196 I 0.0  
 79.4527 I 0.005  
 95.0852 I 0.036  
 110.7190 I 0.063  
 126.3521 I 0.086  
 141.9852 I 0.144  
 157.6184 I 0.203  
 173.2515 I 0.279  
 188.8846 I 0.356  
 204.5178 I 0.432  
 220.1509 I 0.563  
 235.7840 I 0.640  
 251.4172 I 0.680  
 267.0503 I 0.757  
 282.6833 I 0.797  
 298.3164 I 0.878  
 313.9495 I 0.914  
 329.5825 I 0.946  
 345.2156 I 0.973  
 360.8486 I 0.995  
 376.4817 I 0.995  
 392.1147 I 0.995  
 407.7488 I 1.000  
 407.7488 I 0.0  
 407.7488 I-----I-----I-----I-----I-----I-----I-----I MAX

ND DBS----- 222 STD ERRDR- 67.8234  
 CDEF OF VARIATION- 0.31 MEAN----- 216.4868  
 KURTOSIS (BETA 2)- 2.48 MEDIAN---- 214.1608  
 PEARSONIAN SKEW--- 0.06 MODE----- 212.3343

## SLACK TIME FOR ARC MFP-LEAD

CFD 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0  
 328.0195 I-----I-----I-----I-----I-----I-----I-----I MIN  
 I 0.0  
 328.0195 I  
 I\* 0.014  
 344.2705 I  
 I\* 0.023  
 360.5215 I  
 I\* 0.027  
 376.7725 I  
 I\*\* 0.036  
 393.0234 I  
 I\*\*\* 0.059  
 409.2744 I  
 I\*\*\*\*\* 0.095  
 425.5254 I  
 I\*\*\*\*\* 0.162  
 441.7764 I  
 I\*\*\*\*\* 0.252  
 458.0273 I  
 I\*\*\*\*\* 0.338  
 474.2783 I  
 I\*\*\*\*\* 0.419  
 490.5293 I  
 I\*\*\*\*\* 0.518  
 506.7803 I  
 I\*\*\*\*\* 0.608  
 523.0312 I  
 I\*\*\*\*\* 0.698  
 539.2822 I  
 I\*\*\*\*\* 0.797  
 555.5332 I  
 I\*\*\*\*\* 0.865  
 571.7842 I  
 I\*\*\*\*\* 0.905  
 588.0352 I  
 I\*\*\*\*\* 0.923  
 604.2861 I  
 I\*\*\*\*\* 0.950  
 620.5371 I  
 I\*\*\*\*\* 0.964  
 636.7881 I  
 I\*\*\*\*\* 0.982  
 653.0391 I  
 I\*\*\*\*\* 0.995  
 669.2900 I  
 I\*\*\*\*\* 1.000  
 685.5461 I  
 I 0.0  
 685.5461 I-----I-----I-----I-----I-----I-----I-----I MAX

NO OBS----- 222 STD ERROR- 65.9512  
 COEF OF VARIATION- 0.13 MEAN----- 504.8203  
 KURTOSIS (BETA 2)- 3.04 MEDIAN---- 505.1665  
 MULTIMODAL DISTRIBUTION



NETWORK TIME FOR NODE AWDPROD

G-61

|           | CFD    | 0.1   | 0.2   | 0.3   | 0.4   | 0.5   | 0.6   | 0.7   | 0.8   | 0.9   | 1.0 |       |
|-----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 1055.3179 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MIN   |
|           | I      |       |       |       |       |       |       |       |       |       |     | 0.0   |
| 1055.3179 | I      |       |       |       |       |       |       |       |       |       |     | 0.005 |
| 1071.4277 | I      |       |       |       |       |       |       |       |       |       |     | 0.005 |
| 1087.5376 | I      |       |       |       |       |       |       |       |       |       |     | 0.014 |
|           | I*     |       |       |       |       |       |       |       |       |       |     | 0.018 |
| 1103.6475 | I      |       |       |       |       |       |       |       |       |       |     | 0.054 |
|           | I*     |       |       |       |       |       |       |       |       |       |     | 0.095 |
| 1119.7573 | I      |       |       |       |       |       |       |       |       |       |     | 0.144 |
|           | I***   |       |       |       |       |       |       |       |       |       |     | 0.243 |
| 1135.8672 | I      |       |       |       |       |       |       |       |       |       |     | 0.347 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 0.446 |
| 1151.9771 | I      |       |       |       |       |       |       |       |       |       |     | 0.554 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 0.671 |
| 1168.0869 | I      |       |       |       |       |       |       |       |       |       |     | 0.788 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 0.856 |
| 1184.1968 | I      |       |       |       |       |       |       |       |       |       |     | 0.901 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 0.941 |
| 1200.3066 | I      |       |       |       |       |       |       |       |       |       |     | 0.964 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 0.977 |
| 1216.4165 | I      |       |       |       |       |       |       |       |       |       |     | 0.986 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 0.995 |
| 1232.5264 | I      |       |       |       |       |       |       |       |       |       |     | 0.995 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 1248.6362 | I      |       |       |       |       |       |       |       |       |       |     | 1.000 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 1264.7461 | I      |       |       |       |       |       |       |       |       |       |     | 1.000 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 1280.8560 | I      |       |       |       |       |       |       |       |       |       |     | 1.000 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 1296.9658 | I      |       |       |       |       |       |       |       |       |       |     | 1.000 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 1313.0757 | I      |       |       |       |       |       |       |       |       |       |     | 1.000 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 1329.1855 | I      |       |       |       |       |       |       |       |       |       |     | 1.000 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 1345.2954 | I      |       |       |       |       |       |       |       |       |       |     | 1.000 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 1361.4053 | I      |       |       |       |       |       |       |       |       |       |     | 1.000 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 1377.5151 | I      |       |       |       |       |       |       |       |       |       |     | 1.000 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 1393.6250 | I      |       |       |       |       |       |       |       |       |       |     | 1.000 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 1409.7366 | I      |       |       |       |       |       |       |       |       |       |     | 1.000 |
|           | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 1409.7366 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MAX   |

|                         |      |            |           |
|-------------------------|------|------------|-----------|
| NO OBS-----             | 222  | STD ERROR- | 56.3314   |
| COEF OF VARIATION-      | 0.05 | MEAN-----  | 1224.5474 |
| KURTOSIS (BETA 2)-      | 3.27 | MEDIAN---- | 1224.0110 |
| MULTIMODAL DISTRIBUTION |      |            |           |

NETWORK TIME FOR NODE DELCRF1

|           | CFD    | 0.1  | 0.2 | 0.3  | 0.4 | 0.5  | 0.6 | 0.7  | 0.8 | 0.9  | 1.0 |       |
|-----------|--------|------|-----|------|-----|------|-----|------|-----|------|-----|-------|
| 1401.7305 | I      | ---- | I   | ---- | I   | ---- | I   | ---- | I   | ---- | I   | MIN   |
| 1401.7305 | I      |      |     |      |     |      |     |      |     |      |     | 0.0   |
| 1422.9551 | I      |      |     |      |     |      |     |      |     |      |     | 0.005 |
| 1444.1797 | I*     |      |     |      |     |      |     |      |     |      |     | 0.014 |
| 1465.4043 | I      |      |     |      |     |      |     |      |     |      |     | 0.014 |
| 1486.6289 | I*     |      |     |      |     |      |     |      |     |      |     | 0.023 |
| 1507.8535 | I**    |      |     |      |     |      |     |      |     |      |     | 0.041 |
| 1529.0781 | I****  |      |     |      |     |      |     |      |     |      |     | 0.081 |
| 1550.3027 | I***** |      |     |      |     |      |     |      |     |      |     | 0.149 |
| 1571.5273 | I***** |      |     |      |     |      |     |      |     |      |     | 0.212 |
| 1592.7520 | I***** |      |     |      |     |      |     |      |     |      |     | 0.333 |
| 1613.9766 | I***** |      |     |      |     |      |     |      |     |      |     | 0.459 |
| 1635.2012 | I***** |      |     |      |     |      |     |      |     |      |     | 0.554 |
| 1656.4258 | I***** |      |     |      |     |      |     |      |     |      |     | 0.635 |
| 1677.6504 | I***** |      |     |      |     |      |     |      |     |      |     | 0.743 |
| 1698.8750 | I***** |      |     |      |     |      |     |      |     |      |     | 0.833 |
| 1720.0996 | I***** |      |     |      |     |      |     |      |     |      |     | 0.878 |
| 1741.3242 | I***** |      |     |      |     |      |     |      |     |      |     | 0.914 |
| 1762.5488 | I***** |      |     |      |     |      |     |      |     |      |     | 0.941 |
| 1783.7734 | I***** |      |     |      |     |      |     |      |     |      |     | 0.964 |
| 1804.9980 | I***** |      |     |      |     |      |     |      |     |      |     | 0.986 |
| 1826.2227 | I***** |      |     |      |     |      |     |      |     |      |     | 0.995 |
| 1847.4473 | I***** |      |     |      |     |      |     |      |     |      |     | 0.995 |
| 1868.6760 | I***** |      |     |      |     |      |     |      |     |      |     | 1.000 |
| 1868.6760 | I***** |      |     |      |     |      |     |      |     |      |     | 1.000 |
| 1868.6760 | I      | ---- | I   | ---- | I   | ---- | I   | ---- | I   | ---- | I   | MAX   |

NO OBS----- 222 STD ERROR- 77.5768  
 COEF OF VARIATION- 0.05 MEAN----- 1629.7515  
 KURTOSIS (BETA 2)- 3.14 MEDIAN---- 1624.9163  
 PEARSONIAN SKEW--- 0.44 MODE----- 1595.4148

NETWORK TIME FOR NODE STARTED

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|          | CFD    | 0.1  | 0.2  | 0.3  | 0.4  | 0.5  | 0.6  | 0.7  | 0.8  | 0.9  | 1.0  |       |
|----------|--------|------|------|------|------|------|------|------|------|------|------|-------|
| 594.6455 | I      | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | MIN   |
|          | I      |      |      |      |      |      |      |      |      |      |      | 0.0   |
| 594.6455 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I****  |      |      |      |      |      |      |      |      |      |      | 0.077 |
| 599.0059 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I****  |      |      |      |      |      |      |      |      |      |      | 0.077 |
| 603.3662 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I****  |      |      |      |      |      |      |      |      |      |      | 0.077 |
| 607.7266 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I****  |      |      |      |      |      |      |      |      |      |      | 0.077 |
| 612.0869 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I****  |      |      |      |      |      |      |      |      |      |      | 0.077 |
| 616.4473 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.154 |
| 620.8076 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.154 |
| 625.1680 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.308 |
| 629.5283 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.308 |
| 633.8887 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.385 |
| 638.2490 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.385 |
| 642.6094 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.462 |
| 646.9697 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.462 |
| 651.3301 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.538 |
| 655.6904 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.615 |
| 660.0508 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.692 |
| 664.4111 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.692 |
| 668.7715 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.692 |
| 673.1318 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.769 |
| 677.4922 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.769 |
| 681.8525 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 0.846 |
| 686.2129 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 1.000 |
| 690.5752 | I      |      |      |      |      |      |      |      |      |      |      |       |
|          | I***** |      |      |      |      |      |      |      |      |      |      | 1.000 |
| 690.5752 | I      | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | MAX   |

|                         |      |            |          |
|-------------------------|------|------------|----------|
| NO OBS-----             | 15   | STD ERROR- | 29.3294  |
| COEF OF VARIATION-      | 0.05 | MEAN-----  | 650.9648 |
| KURTOSIS (BETA 2)-      | 1.99 | MEDIAN---- | 655.0598 |
| MULTIMODAL DISTRIBUTION |      |            |          |

NETWORK TIME FOR NODE STARTMAC

|          | CFD    | 0.1   | 0.2   | 0.3   | 0.4   | 0.5   | 0.6   | 0.7   | 0.8   | 0.9   | 1.0 |       |
|----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 581.2058 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MIN   |
|          | I      |       |       |       |       |       |       |       |       |       |     | 0.0   |
| 581.2058 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***   |       |       |       |       |       |       |       |       |       |     | 0.067 |
| 585.5492 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.133 |
| 590.6926 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.200 |
| 595.4360 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.200 |
| 600.1794 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.333 |
| 604.9229 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.333 |
| 609.6663 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.333 |
| 614.4097 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.333 |
| 619.1531 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.533 |
| 623.8965 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.600 |
| 628.6399 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.600 |
| 633.3833 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.600 |
| 638.1267 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.667 |
| 642.8701 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.733 |
| 647.6135 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.733 |
| 652.3569 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.800 |
| 657.1003 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.867 |
| 661.8437 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.867 |
| 666.5872 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.867 |
| 671.3306 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.933 |
| 676.0740 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 0.933 |
| 680.8174 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 685.5630 | I      |       |       |       |       |       |       |       |       |       |     |       |
|          | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 685.5630 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MAX   |

|                    |      |            |          |
|--------------------|------|------------|----------|
| NO OBS-----        | 15   | STD ERROR- | 31.4160  |
| COEF OF VARIATION- | 0.05 | MEAN-----  | 627.7573 |
| KURTOSIS (BETA 2)- | 1.92 | MEDIAN---- | 623.8562 |
| PEARSONIAN SKEW--- | 0.18 | MODE-----  | 621.9990 |

NETWORK TIME FOR NODE IOC

|           | CFC | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |       |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 1525.4026 | I   | I   | I   | I   | I   | I   | I   | I   | I   | I   | I   | MIN   |
|           | I   |     |     |     |     |     |     |     |     |     |     | 0.0   |
| 1525.4026 | I   |     |     |     |     |     |     |     |     |     |     | 0.005 |
| 1547.9277 | I   |     |     |     |     |     |     |     |     |     |     | 0.014 |
| 1570.4529 | I   |     |     |     |     |     |     |     |     |     |     | 0.014 |
| 1592.9780 | I   |     |     |     |     |     |     |     |     |     |     | 0.014 |
| 1615.5032 | I   |     |     |     |     |     |     |     |     |     |     | 0.027 |
| 1638.0283 | I   |     |     |     |     |     |     |     |     |     |     | 0.063 |
| 1660.5535 | I   |     |     |     |     |     |     |     |     |     |     | 0.108 |
| 1683.0786 | I   |     |     |     |     |     |     |     |     |     |     | 0.189 |
| 1705.6038 | I   |     |     |     |     |     |     |     |     |     |     | 0.284 |
| 1728.1289 | I   |     |     |     |     |     |     |     |     |     |     | 0.369 |
| 1750.6541 | I   |     |     |     |     |     |     |     |     |     |     | 0.482 |
| 1773.1792 | I   |     |     |     |     |     |     |     |     |     |     | 0.586 |
| 1795.7043 | I   |     |     |     |     |     |     |     |     |     |     | 0.703 |
| 1818.2295 | I   |     |     |     |     |     |     |     |     |     |     | 0.802 |
| 1840.7546 | I   |     |     |     |     |     |     |     |     |     |     | 0.860 |
| 1863.2798 | I   |     |     |     |     |     |     |     |     |     |     | 0.896 |
| 1885.8049 | I   |     |     |     |     |     |     |     |     |     |     | 0.946 |
| 1908.3301 | I   |     |     |     |     |     |     |     |     |     |     | 0.959 |
| 1930.8552 | I   |     |     |     |     |     |     |     |     |     |     | 0.977 |
| 1953.3804 | I   |     |     |     |     |     |     |     |     |     |     | 0.982 |
| 1975.9055 | I   |     |     |     |     |     |     |     |     |     |     | 0.991 |
| 1998.4307 | I   |     |     |     |     |     |     |     |     |     |     | 1.000 |
| 2020.9604 | I   |     |     |     |     |     |     |     |     |     |     | 1.000 |
| 2020.9604 | I   | I   | I   | I   | I   | I   | I   | I   | I   | I   | I   | MAX   |

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|                    |      |            |           |
|--------------------|------|------------|-----------|
| NO OBS-----        | 222  | STD ERROR- | 81.9088   |
| COEF OF VARIATION- | 0.05 | MEAN-----  | 1777.5835 |
| KURTOSIS (BETA 2)- | 3.32 | MEDIAN---- | 1775.1792 |
| PEARSONIAN SKEW--- | 0.34 | MODE-----  | 1805.3579 |

# NETWORK TIME FOR THE COMPOSITE TERMINAL NODE

|           | CFC    | 0.1   | 0.2   | 0.3   | 0.4   | 0.5   | 0.6   | 0.7   | 0.8   | 0.9   | 1.0   |       |
|-----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 581.2058  | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | MIN   |
|           | I      |       |       |       |       |       |       |       |       |       |       | 0.0   |
| 581.2058  | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***   |       |       |       |       |       |       |       |       |       |       | 0.068 |
| 646.6492  | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.112 |
| 712.0925  | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.112 |
| 777.5359  | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.112 |
| 842.9792  | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.112 |
| 908.4226  | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.112 |
| 973.8660  | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.112 |
| 1039.3093 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.112 |
| 1104.7527 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.112 |
| 1170.1960 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.112 |
| 1235.6394 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.112 |
| 1301.0828 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.112 |
| 1366.5261 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.112 |
| 1431.9695 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.112 |
| 1497.4128 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.124 |
| 1562.8562 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.128 |
| 1628.2996 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.248 |
| 1693.7429 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.476 |
| 1759.1863 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.772 |
| 1824.6296 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.924 |
| 1890.0730 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 0.980 |
| 1955.5164 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 1.000 |
| 2020.9604 | I      |       |       |       |       |       |       |       |       |       |       |       |
|           | I***** |       |       |       |       |       |       |       |       |       |       | 1.000 |
| 2020.9604 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | MAX   |

|                    |      |            |           |
|--------------------|------|------------|-----------|
| NO OBS-----        | 250  | STD ERROR- | 368.2732  |
| COEF OF VARIATION- | 0.22 | MEAN-----  | 1650.0063 |
| KURTOSIS (BETA 2)- | 6.49 | MEDIAN---- | 1764.5093 |
| PEARSONIAN SKEW--- | 0.35 | MODE-----  | 1780.1775 |

PATH CCST FOR THE COMPOSITE TERMINAL NODE  
 NO OBS = 250 AVE = 0.0







ARCS CRITICAL-CPTIMUM PATH INDEX - NO. PATHS = 250

0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

[illegible]



NODES MEAN COMPLETION TIME & REALIZATION FREQUENCY

|          |           |     |
|----------|-----------|-----|
| START    | 0.0       | 250 |
| STARTIEP | 0.0       | 250 |
| AFFRCC   | 216.2597  | 250 |
| C&EEST   | 287.2322  | 250 |
| NDIW61   | 291.9277  | 250 |
| INITCESY | 301.9282  | 250 |
| CCMFL-MS | 336.9646  | 250 |
| CCMFL-US | 381.8865  | 250 |
| COMPL-CE | 393.4065  | 250 |
| COMPLRPT | 472.0767  | 250 |
| PREIPR   | 540.2439  | 250 |
| MADF-I   | 605.1152  | 250 |
| STARTMAC | 627.7573  | 15  |
| STARTNDI | 634.6770  | 222 |
| STARTR&D | 650.9648  | 13  |
| APINPUT  | 754.7349  | 222 |
| PFINPUT  | 784.2219  | 222 |
| MADF-II  | 832.4441  | 222 |
| MFFDRAFT | 896.0195  | 222 |
| EST-NEIT | 979.3523  | 222 |
| MFPCOORD | 996.0671  | 222 |
| ISSUERFP | 1002.2319 | 222 |
| RECPSLS  | 1063.0149 | 222 |
| MFFCOMPL | 1092.7534 | 222 |
| INIT-NEG | 1122.6096 | 222 |
| CCMFLNEG | 1154.0891 | 222 |
| SVYCOMPL | 1191.6624 | 222 |
| AWDPROD  | 1224.5474 | 222 |
| AWD-BOA  | 1236.6448 | 222 |

|          |           |     |
|----------|-----------|-----|
| AWD-CLS  | 1237.8040 | 222 |
| CCMF-ASL | 1335.2273 | 222 |
| CLS FAC  | 1377.6770 | 222 |
| DUMMY1   | 1388.2949 | 222 |
| ACPT-TMS | 1529.0945 | 222 |
| DELCRF1  | 1629.7515 | 222 |
| TESTCR1  | 1647.8508 | 222 |
| ACCFT1   | 1719.6575 | 222 |
| COND-REL | 1775.5835 | 222 |
| IOCLEAD  | 1776.5835 | 222 |
| IOC      | 1777.5835 | 222 |
| INIT-FOE | 1803.2014 | 222 |
| CCMFLFOE | 1858.8250 | 222 |
| CCMFLIER | 1926.5671 | 222 |
| FINALDEL | 1992.0686 | 222 |
| COORDCNF | 1992.2366 | 222 |
| FLDGIPR  | 2087.1562 | 222 |
| FULL-REL | 2321.0044 | 222 |

CCERA-30MM PROGRAM-PROGRAM ALTERNATIVE 1

PROBLEM IDENTIFICATION CARD OPTION----- 1

TYPE OF INPUT OPTION----- 0

TYPE OF OUTPUT OPTION----- 4

CCSTING AND PRUNING OPTION----- 0

FULL PRINT TRIP OPTION----- 0

CCRRELATION CCMPUTATION AND PLCT OPTICK----- 0

COST-PERFORMANCE TIME INTERVAL OPTION----- 1

COMPOSITE TERMINAL NODE MINIMUMS AND MAXIMUMS OPTION----- 0

MEAN PRINT ORDER----- 0

INITIAL SEED----- 435459

NUMBER OF ITERATIONS----- 500

YEARLY INTEREST RATE USED FOR INFLATION ADJUSTMENTS----- 0.0

YEARLY INTEREST RATE USED FOR PRESENT VALUE DISCOUNTING---- 0.0

TIME FACTOR WHICH CONVERTS PROGRAM TIME TO A YEARLY BASE--- 0.0

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|                                 | TIME | COST | PERF |
|---------------------------------|------|------|------|
| TERMINAL NODE SELECTION WEIGHTS | 1.00 | 0.0  | 0.0  |
| CRITICAL - OPTIMUM PATH WEIGHTS | 1.00 | 0.0  | 0.0  |
| INITIAL VALUES                  | 0.0  | 0.0  | 0.0  |

CCST-PERFORMANCE TIME INTERVAL DATA

|      |      |
|------|------|
| 0.0  | 6.0  |
| 6.0  | 12.0 |
| 12.0 | 18.0 |
| 18.0 | 24.0 |
| 24.0 | 30.0 |
| 30.0 | 30.0 |

ENDCTPR

|        |       |       |      |      |     |
|--------|-------|-------|------|------|-----|
| D1     | START | 1     | 1.   |      |     |
| HS2GS  | 1     | 18    | 1.   |      |     |
| HS2GS  | DTIME | 1 3.  | 5.53 | 8.13 | 6.5 |
| HS2GS  | M     | 1 .95 |      |      |     |
| FHS2GS | 1     | FAIL  | 1.   |      |     |
| FHS2GS | M     | 1 .05 |      |      |     |

|            |       |         |      |       |      |  |
|------------|-------|---------|------|-------|------|--|
| M/AG2      | 18    | 31      | 1.   |       |      |  |
| M/AG2      | DTIME | 1 3.    | 2.98 | 4.38  | 3.5  |  |
| D15        | 31    | SUCCESS | 1.   |       |      |  |
| D2         | START | 2       | 1.   |       |      |  |
| BLDG3      | 2     | 14      | 1.   |       |      |  |
| BLDG3      | DTIME | 1 3.    | 1.28 | 1.88  | 1.5  |  |
| BLDG3      | DCOST | 1 3.    | .312 | .634  | .519 |  |
| BLDG3      | M     | 1 .98   |      |       |      |  |
| FBLDG3     | 2     | FAIL    | 1.   |       |      |  |
| FBLDG3     | M     | 1 .02   |      |       |      |  |
| HSG3       | 14    | 19      | 1.   |       |      |  |
| HSG3       | DTIME | 1 3.    | 6.38 | 9.38  | 7.5  |  |
| HSG3       | DCOST | 1 3.    | .312 | .634  | .519 |  |
| HSG3       | M     | 1 .995  |      |       |      |  |
| FHSG3      | 14    | FAIL    | 1.   |       |      |  |
| FHSG3      | M     | 1 .005  |      |       |      |  |
| TST/MG3    | 19    | 32      | 1.   |       |      |  |
| TST/MG3    | DTIME | 1 3.    | 5.95 | 8.75  | 7.0  |  |
| TST/MG3    | DCOST | 1 3.    | .312 | .634  | .519 |  |
| TST/MG3    | M     | 1 .995  |      |       |      |  |
| FTST/MG319 |       | FAIL    | 1.   |       |      |  |
| FTST/MG3M  |       | 1 .005  |      |       |      |  |
| D16        | 32    | SUCCESS | 1.   |       |      |  |
| D3         | START | 3       | 1.   |       |      |  |
| BLDG4      | 3     | 22      | 1.   |       |      |  |
| BLDG4      | DTIME | 1 3.    | 9.35 | 13.75 | 11.0 |  |
| BLDG4      | DCOST | 1 3.    | .346 | .731  | .597 |  |
| BLDG4      | M     | 1 .985  |      |       |      |  |
| FBLDG4     | 3     | FAIL    | 1.   |       |      |  |
| FBLDG4     | M     | 1 .015  |      |       |      |  |
| D14        | 18    | 22      | 1.   |       |      |  |
| SG4TOGE    | 22    | 24      | 1.   |       |      |  |
| SG4TOGE    | DTIME | 1 3.    | .43  | .63   | .5   |  |
| D4         | START | 4       | 1.   |       |      |  |
| BLDG5      | 4     | 15      | 1.   |       |      |  |
| BLDG5      | DTIME | 1 3.    | 3.4  | 5.    | 4.0  |  |
| BLDG5      | DCOST | 1 3.    | .346 | .731  | .597 |  |
| BLDG5      | M     | 1 .985  |      |       |      |  |
| FELDG5     | 4     | FAIL    | 1.   |       |      |  |
| FELDG5     | M     | 1 .015  |      |       |      |  |
| TSTG5      | 15    | 20      | 1.   |       |      |  |
| TSTG5      | DTIME | 1 3.    | 1.42 | 2.09  | 1.67 |  |



|            |       |         |      |       |       |       |
|------------|-------|---------|------|-------|-------|-------|
| TSTG5      | DCOST | 1       | 3.   | .346  | .731  | .597  |
| TSTG5      | M     | 1       | .99  |       |       |       |
| FTSTG5     | 15    | FAIL    | 1.   |       |       |       |
| FTSTG5     | M     | 1       | .01  |       |       |       |
| D6         | START | 6       | 1.   |       |       |       |
| BLDT1      | 6     | 16      | 1.   |       |       |       |
| BLDT1      | DTIME | 1       | 3.   | 4.42  | 6.5   | 5.2   |
| BLCT1      | DCOST | 1       | 3.   | .244  | .392  | .319  |
| BLCT1      | M     | 1       | 1.0  |       |       |       |
| FELCT1     | 6     | FAIL    | 1.   |       |       |       |
| FBLDT1     | M     | 1       | 0.0  |       |       |       |
| ST1T0H     | 16    | 20      | 1.   |       |       |       |
| ST1T0H     | DTIME | 1       | 3.   | .43   | .63   | .5    |
| TSTG5T1    | 20    | 33      | 1.   |       |       |       |
| TSTG5T1    | DTIME | 1       | 3.   | 8.78  | 12.91 | 10.33 |
| TSTG5T1    | DCOST | 1       | 3.   | .346  | .731  | .597  |
| TSTG5T1    | M     | 1       | .98  |       |       |       |
| FTSTG5T120 |       | FAIL    | 1.   |       |       |       |
| FTSTG5T1M  |       | 1       | .02  |       |       |       |
| D17        | 33    | SUCCESS | 1.   |       |       |       |
| D5         | START | 5       | 1.   |       |       |       |
| BLD3GS     | 5     | 23      | 1.   |       |       |       |
| BLD3GS     | DTIME | 1       | 3.   | 9.35  | 13.75 | 11.0  |
| BLD3GS     | DCOST | 1       | 3.   | 1.038 | 2.193 | 1.790 |
| BLD3GS     | M     | 1       | .995 |       |       |       |
| FBLD3GS    | 5     | FAIL    | 1.   |       |       |       |
| FBLD3GS    | M     | 1       | .005 |       |       |       |
| SG8T0B     | 23    | 35      | 1.   |       |       |       |
| SG8T0B     | DTIME | 1       | 3.   | .43   | .63   | .5    |
| D19        | 35    | SUCCESS | 1.   |       |       |       |
| D7         | START | 7       | 1.   |       |       |       |
| SG6TCE     | 23    | 27      | 1.   |       |       |       |
| SG6TCE     | DTIME | 1       | 3.   | .43   | .63   | .5    |
| SG7T0B     | 23    | 28      | 1.   |       |       |       |
| SG7T0B     | DTIME | 1       | 3.   | .43   | .63   | .5    |
| BLCT2      | 7     | 24      | 1.   |       |       |       |
| BLCT2      | DTIME | 1       | 3.   | 5.95  | 8.75  | 7.0   |
| BLCT2      | DCOST | 1       | 3.   | .244  | .392  | .319  |
| BLCT2      | M     | 1       | 1.0  |       |       |       |
| FBLDT2     | 7     | FAIL    | 1.   |       |       |       |
| FBLDT2     | M     | 1       | 0.0  |       |       |       |

|            |       |         |      |       |       |  |
|------------|-------|---------|------|-------|-------|--|
| TSTG4T2    | 24    | 34      | 1.   |       |       |  |
| TSTG4T2    | DTIME | 1 3.    | 5.1  | 7.5   | 6.0   |  |
| TSTG4T2    | DCOST | 1 3.    | .244 | .392  | .319  |  |
| TSTG4T2    | M     | 1 .98   |      |       |       |  |
| FTSTG4T224 |       | FAIL    | 1.   |       |       |  |
| FTSTG4T2M  |       | 1 .02   |      |       |       |  |
| D18        | 34    | SUCCESS | 1.   |       |       |  |
| DE         | START | 8       | 1.   |       |       |  |
| BLCT3      | 8     | 25      | 1.   |       |       |  |
| BLDT3      | DTIME | 1 3.    | 7.65 | 11.25 | 9.0   |  |
| BLDT3      | DCOST | 1 3.    | .244 | .392  | .319  |  |
| BLCT3      | M     | 1 1.0   |      |       |       |  |
| FBLCT3     | 8     | FAIL    | 1.   |       |       |  |
| FBLCT3     | M     | 1 0.0   |      |       |       |  |
| ST3TCB     | 25    | 27      | 1.   |       |       |  |
| ST3TOB     | DTIME | 1 3.    | .43  | .63   | .5    |  |
| D9         | START | 9       | 1.   |       |       |  |
| BLDT4      | 9     | 26      | 1.   |       |       |  |
| BLCT4      | DTIME | 1 3.    | 7.65 | 11.25 | 9.0   |  |
| BLCT4      | DCOST | 1 3.    | .244 | .392  | .319  |  |
| BLCT4      | M     | 1 1.0   |      |       |       |  |
| FBLDT4     | 9     | FAIL    | 1.   |       |       |  |
| FBLDT4     | M     | 1 0.0   |      |       |       |  |
| ST4TCB     | 26    | 28      | 1.   |       |       |  |
| ST4TOB     | DTIME | 1 3.    | .43  | .63   | .5    |  |
| D10        | START | 10      | 1.   |       |       |  |
| ENGP       | 10    | 17      | 1.   |       |       |  |
| ENGP       | DTIME | 1 3.    | 1.79 | 2.63  | 2.1   |  |
| ENGP       | DCOST | 1 3.    | .972 | 1.373 | 1.058 |  |
| ENGP       | M     | 1 1.0   |      |       |       |  |
| FENGP      | 10    | FAIL    | 1.   |       |       |  |
| FENGP      | M     | 1 0.0   |      |       |       |  |
| FBMCCP     | 17    | 21      | 1.   |       |       |  |
| FBMODP     | DTIME | 1 3.    | 5.02 | 7.38  | 5.9   |  |
| FBMODP     | DCOST | 1 3.    | .972 | 1.373 | 1.058 |  |
| FBMODP     | M     | 1 1.0   |      |       |       |  |
| FFBMCCP    | 17    | FAIL    | 1.   |       |       |  |
| FFBMCCP    | M     | 1 0.0   |      |       |       |  |
| TSTP       | 21    | 36      | 1.   |       |       |  |
| TSTP       | DTIME | 1 3.    | 7.23 | 10.63 | 8.5   |  |
| TSTP       | DCOST | 1 3.    | .972 | 1.373 | 1.058 |  |
| TSTP       | M     | 1 1.0   |      |       |       |  |
| FTSTP      | 21    | FAIL    | 1.   |       |       |  |

|       |       |       |         |       |       |       |
|-------|-------|-------|---------|-------|-------|-------|
| FTSTP | M     | 1     | 0.0     |       |       |       |
| D20   | 36    |       | SUCCESS | 1.    |       |       |
| D11   | START | 11    |         | 1.    |       |       |
| BLDI  | 11    | 27    |         | 1.    |       |       |
| BLCI  | DTIME | 1 3.  |         | 10.2  | 15.   | 12.0  |
| BLCI  | DCOST | 1 3.  |         | .972  | 1.373 | 1.058 |
| BLCI  | M     | 1 1.0 |         |       |       |       |
| FBLDI | 11    |       | FAIL    | 1.    |       |       |
| FBLDI | M     | 1 0.0 |         |       |       |       |
| INTI  | 27    | 29    |         | 1.    |       |       |
| INTI  | DTIME | 1 3.  |         | 1.23  | 1.88  | 1.5   |
| INTI  | DCOST | 1 3.  |         | .972  | 1.373 | 1.058 |
| INTI  | M     | 1 1.0 |         |       |       |       |
| FINTI | 27    |       | FAIL    | 1.    |       |       |
| FINTI | M     | 1 0.0 |         |       |       |       |
| TSTI  | 29    | 37    |         | 1.    |       |       |
| TSTI  | DTIME | 1 3.  |         | 2.98  | 4.38  | 3.5   |
| TSTI  | DCOST | 1 3.  |         | .972  | 1.373 | 1.058 |
| TSTI  | M     | 1 .95 |         |       |       |       |
| FTSTI | 29    |       | FAIL    | 1.    |       |       |
| FTSTI | M     | 1 .05 |         |       |       |       |
| D21   | 37    |       | SUCCESS | 1.    |       |       |
| D12   | START | 12    |         | 1.    |       |       |
| BLDQ  | 12    | 28    |         | 1.    |       |       |
| BLDQ  | DTIME | 1 3.  |         | 14.88 | 21.88 | 17.5  |
| BLDQ  | DCOST | 1 3.  |         | .972  | 1.373 | 1.058 |
| BLDQ  | M     | 1 1.0 |         |       |       |       |
| FBLDQ | 12    |       | FAIL    | 1.    |       |       |
| FBLDQ | M     | 1 0.0 |         |       |       |       |
| INTQ  | 28    | 30    |         | 1.    |       |       |
| INTQ  | DTIME | 1 3.  |         | .43   | .63   | .5    |
| INTQ  | DCOST | 1 3.  |         | .972  | 1.373 | 1.058 |
| INTQ  | M     | 1 1.0 |         |       |       |       |
| FINTQ | 28    |       | FAIL    | 1.    |       |       |
| FINTQ | M     | 1 0.0 |         |       |       |       |
| TSTQ  | 30    | 38    |         | 1.    |       |       |
| TSTQ  | DTIME | 1 3.  |         | 4.25  | 6.25  | 5.0   |
| TSTQ  | DCOST | 1 3.  |         | .972  | 1.373 | 1.058 |
| TSTQ  | M     | 1 .97 |         |       |       |       |
| FTSTQ | 30    |       | FAIL    | 1.    |       |       |
| FTSTQ | M     | 1 .03 |         |       |       |       |
| D22   | 38    |       | SUCCESS | 1.    |       |       |

ENDARC

START 1 2

1 2 3

2 2 3

3 2 3

4 2 3

5 2 3

6 2 3

7 2 3

8 2 3

9 2 3

10 2 3

11 2 3

12 2 3

14 2 3

15 2 3

16 2 2

17 2 3

18 2 2

19 2 3

20 2 3

21 2 3

22 4 2

23 2 2

24 2 3

25 2 2

26 2 2

27 2 3

28 2 3

29 2 3

30 2 316 1

31 2 2

32 2 2

33 2 2

34 2 2

35 2 2

36 2 2

37 2 2

38 2 2

SUCCESS 2 116

FAIL 4 11

ENDNODE

WARNING NO. 6135 PARAMETER =

WARNING NO. 6140 PARAMETER =

WARNING NO. 6144 PARAMETER =

WARNING NO. 6166 PARAMETER =

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POSITIVE COST INCURRED BETWEEN THE TIME PERIODS OF 0.0 - 6.00

| CFD     | 0.1    | 0.2   | 0.3   | 0.4   | 0.5   | 0.6   | 0.7   | 0.8   | 0.9   | 1.0   |       |
|---------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 5.5576  | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | MIN   |
|         | I      |       |       |       |       |       |       |       |       |       | 0.0   |
| 5.5576  | I      |       |       |       |       |       |       |       |       |       | 0.002 |
| 5.8287  | I      |       |       |       |       |       |       |       |       |       | 0.006 |
| 6.0999  | I      |       |       |       |       |       |       |       |       |       | 0.006 |
| 6.3711  | I      |       |       |       |       |       |       |       |       |       | 0.006 |
| 6.6422  | I      |       |       |       |       |       |       |       |       |       | 0.008 |
| 6.9134  | I      |       |       |       |       |       |       |       |       |       | 0.008 |
| 7.1846  | I      |       |       |       |       |       |       |       |       |       | 0.008 |
| 7.4557  | I      |       |       |       |       |       |       |       |       |       | 0.010 |
| 7.7269  | I      |       |       |       |       |       |       |       |       |       | 0.012 |
| 7.9981  | I*     |       |       |       |       |       |       |       |       |       | 0.012 |
| 8.2692  | I*     |       |       |       |       |       |       |       |       |       | 0.014 |
| 8.5404  | I*     |       |       |       |       |       |       |       |       |       | 0.018 |
| 8.8116  | I*     |       |       |       |       |       |       |       |       |       | 0.024 |
| 9.0827  | I      |       |       |       |       |       |       |       |       |       | 0.040 |
| 9.3539  | I**    |       |       |       |       |       |       |       |       |       | 0.074 |
| 9.6250  | I****  |       |       |       |       |       |       |       |       |       | 0.180 |
| 9.8962  | I***** |       |       |       |       |       |       |       |       |       | 0.380 |
| 10.1674 | I***** |       |       |       |       |       |       |       |       |       | 0.614 |
| 10.4385 | I***** |       |       |       |       |       |       |       |       |       | 0.796 |
| 10.7097 | I***** |       |       |       |       |       |       |       |       |       | 0.928 |
| 10.9809 | I***** |       |       |       |       |       |       |       |       |       | 0.986 |
| 11.2520 | I***** |       |       |       |       |       |       |       |       |       | 1.000 |
| 11.5232 | I***** |       |       |       |       |       |       |       |       |       | 1.000 |
| 11.5232 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | MAX   |

|                    |       |            |         |
|--------------------|-------|------------|---------|
| NO OBS-----        | 500   | STD ERROR- | 0.6250  |
| COEF OF VARIATION- | 0.06  | MEAN-----  | 10.2668 |
| KURTOSIS (BETA 2)- | 19.11 | MEDIAN---- | 10.3056 |
| PEARSONIAN SKEW--- | 0.01  | MODE-----  | 10.2746 |

POSITIVE COST INCURRED BETWEEN THE TIME PERIODS OF 6.00 - 12.00

|        | CFD    | 0.1   | 0.2   | 0.3   | 0.4   | 0.5   | 0.6   | 0.7   | 0.8   | 0.9   | 1.0 |       |
|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 1.0293 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MIN   |
|        | I      |       |       |       |       |       |       |       |       |       |     | 0.0   |
| 1.0293 | I      |       |       |       |       |       |       |       |       |       |     | 0.002 |
| 1.2028 | I      |       |       |       |       |       |       |       |       |       |     | 0.004 |
| 1.3763 | I      |       |       |       |       |       |       |       |       |       |     | 0.016 |
| 1.5499 | I*     |       |       |       |       |       |       |       |       |       |     | 0.036 |
| 1.7234 | I**    |       |       |       |       |       |       |       |       |       |     | 0.144 |
| 1.8969 | I***** |       |       |       |       |       |       |       |       |       |     | 0.308 |
| 2.0705 | I***** |       |       |       |       |       |       |       |       |       |     | 0.360 |
| 2.2440 | I***** |       |       |       |       |       |       |       |       |       |     | 0.478 |
| 2.4175 | I***** |       |       |       |       |       |       |       |       |       |     | 0.664 |
| 2.5911 | I***** |       |       |       |       |       |       |       |       |       |     | 0.784 |
| 2.7646 | I***** |       |       |       |       |       |       |       |       |       |     | 0.812 |
| 2.9381 | I***** |       |       |       |       |       |       |       |       |       |     | 0.850 |
| 3.1117 | I***** |       |       |       |       |       |       |       |       |       |     | 0.892 |
| 3.2852 | I***** |       |       |       |       |       |       |       |       |       |     | 0.916 |
| 3.4587 | I***** |       |       |       |       |       |       |       |       |       |     | 0.948 |
| 3.6323 | I***** |       |       |       |       |       |       |       |       |       |     | 0.982 |
| 3.8058 | I***** |       |       |       |       |       |       |       |       |       |     | 0.992 |
| 3.9793 | I***** |       |       |       |       |       |       |       |       |       |     | 0.996 |
| 4.1529 | I***** |       |       |       |       |       |       |       |       |       |     | 0.996 |
| 4.3264 | I***** |       |       |       |       |       |       |       |       |       |     | 0.996 |
| 4.4999 | I***** |       |       |       |       |       |       |       |       |       |     | 0.996 |
| 4.6735 | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 4.8470 | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 4.8470 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MAX   |

|                    |      |            |        |
|--------------------|------|------------|--------|
| NO OBS-----        | 500  | STD ERROR- | 0.5741 |
| COEF OF VARIATION- | 0.23 | MEAN-----  | 2.4745 |
| KURTOSIS (BETA 2)- | 3.77 | MEDIAN---- | 2.4405 |
| PEARSONIAN SKEW--- | 0.05 | MODE-----  | 2.5056 |



POSITIVE COST INCURRED BETWEEN THE TIME PERIODS OF 12.00 - 18.00

|        | CFD    | 0.1   | 0.2   | 0.3   | 0.4   | .5    | 0.6   | 0.7   | 0.8   | 0.9   | 1.0   |       |
|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.9847 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | MIN   |
|        | I      |       |       |       |       |       |       |       |       |       |       | 0.0   |
| 0.9847 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I****  |       |       |       |       |       |       |       |       |       |       | 0.088 |
| 1.1654 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.130 |
| 1.3461 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.130 |
| 1.5267 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.130 |
| 1.7074 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.130 |
| 1.8881 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.151 |
| 2.0687 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.330 |
| 2.2494 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.519 |
| 2.4301 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.568 |
| 2.6107 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.572 |
| 2.7914 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.572 |
| 2.9721 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.576 |
| 3.1527 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.625 |
| 3.3334 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.701 |
| 3.5141 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.749 |
| 3.6947 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.752 |
| 3.8754 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.752 |
| 4.0561 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.760 |
| 4.2367 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.802 |
| 4.4174 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.898 |
| 4.5980 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 0.978 |
| 4.7787 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 1.000 |
| 4.9594 | I      |       |       |       |       |       |       |       |       |       |       |       |
|        | I***** |       |       |       |       |       |       |       |       |       |       | 1.000 |
| 4.9594 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | MAX   |

|                    |      |            |        |
|--------------------|------|------------|--------|
| NO OBS-----        | 491  | STD ERROR- | 1.1522 |
| COEF OF VARIATION- | 0.40 | MEAN-----  | 2.8978 |
| KURTOSIS (BETA 2)- | 1.91 | MEDIAN---- | 2.4032 |
| PEARSONIAN SKEW--- | 0.55 | MODE-----  | 2.2616 |

POSITIVE COST INCURRED BETWEEN THE TIME PERIODS OF 18.00 - 24.00

|        | CFD    | 0.1   | 0.2   | 0.3   | 0.4   | 0.5   | 0.6   | 0.7   | 0.8   | 0.9   | 1.0 |       |
|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 0.9874 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MIN   |
|        | I      |       |       |       |       |       |       |       |       |       |     | 0.0   |
| 0.9874 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***   |       |       |       |       |       |       |       |       |       |     | 0.060 |
| 1.0622 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.117 |
| 1.1370 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.151 |
| 1.2119 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.186 |
| 1.2867 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.202 |
| 1.3615 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.202 |
| 1.4363 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.202 |
| 1.5111 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.202 |
| 1.5859 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.202 |
| 1.6607 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.202 |
| 1.7355 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.202 |
| 1.8103 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.202 |
| 1.8851 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.202 |
| 1.9599 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.211 |
| 2.0347 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.265 |
| 2.1095 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.394 |
| 2.1844 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.546 |
| 2.2592 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.729 |
| 2.3340 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.890 |
| 2.4088 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.972 |
| 2.4836 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 0.987 |
| 2.5584 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 2.6332 | I      |       |       |       |       |       |       |       |       |       |     |       |
|        | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 2.6332 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MAX   |

|                    |      |            |        |
|--------------------|------|------------|--------|
| NO OBS-----        | 317  | STD ERROR- | 0.4745 |
| COEF OF VARIATION- | 0.23 | MEAN-----  | 2.0479 |
| KURTOSIS (BETA 2)- | 3.09 | MEDIAN---- | 2.2426 |
| PEARSONIAN SKEW--- | 0.54 | MODE-----  | 2.3032 |

POSITIVE COST INCURRED BETWEEN THE TIME PERIODS OF 0.0 - 30.00

|         | CFD    | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |       |
|---------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 7.8023  | I      | I   | I   | I   | I   | I   | I   | I   | I   | I   | I   | MIN   |
|         | I      |     |     |     |     |     |     |     |     |     |     | 0.0   |
| 7.8023  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I      |     |     |     |     |     |     |     |     |     |     | 0.006 |
| 8.2812  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I      |     |     |     |     |     |     |     |     |     |     | 0.006 |
| 8.7600  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I      |     |     |     |     |     |     |     |     |     |     | 0.008 |
| 9.2388  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I      |     |     |     |     |     |     |     |     |     |     | 0.010 |
| 9.7177  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I*     |     |     |     |     |     |     |     |     |     |     | 0.012 |
| 10.1965 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I*     |     |     |     |     |     |     |     |     |     |     | 0.012 |
| 10.6754 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I*     |     |     |     |     |     |     |     |     |     |     | 0.012 |
| 11.1542 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I*     |     |     |     |     |     |     |     |     |     |     | 0.014 |
| 11.6331 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I*     |     |     |     |     |     |     |     |     |     |     | 0.014 |
| 12.1119 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I*     |     |     |     |     |     |     |     |     |     |     | 0.014 |
| 12.5908 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I*     |     |     |     |     |     |     |     |     |     |     | 0.014 |
| 13.0696 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I*     |     |     |     |     |     |     |     |     |     |     | 0.014 |
| 13.5485 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I*     |     |     |     |     |     |     |     |     |     |     | 0.018 |
| 14.0273 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I*     |     |     |     |     |     |     |     |     |     |     | 0.022 |
| 14.5061 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I*     |     |     |     |     |     |     |     |     |     |     | 0.030 |
| 14.9850 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I**    |     |     |     |     |     |     |     |     |     |     | 0.038 |
| 15.4638 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I****  |     |     |     |     |     |     |     |     |     |     | 0.078 |
| 15.9427 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.166 |
| 16.4215 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.354 |
| 16.9004 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.716 |
| 17.3792 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.968 |
| 17.8580 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 1.000 |
| 18.3369 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 1.000 |
| 18.3369 | I      | I   | I   | I   | I   | I   | I   | I   | I   | I   | I   | MAX   |

|                    |       |            |         |
|--------------------|-------|------------|---------|
| NO OBS-----        | 500   | STD ERROR- | 1.1354  |
| COEF OF VARIATION- | 0.07  | MEAN-----  | 16.8849 |
| KURTOSIS (BETA 2)- | 35.54 | MEDIAN---- | 17.0802 |
| PEARSONIAN SKEW--- | 0.27  | MODE-----  | 17.1937 |

NETWORK TIME FOR NODE 30

|         | CFD    | 0.1   | 0.2   | 0.3   | 0.4   | 0.5   | 0.6   | 0.7   | 0.8   | 0.9   | 1.0 |       |
|---------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 15.6363 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MIN   |
|         | I      |       |       |       |       |       |       |       |       |       |     | 0.0   |
| 15.6363 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I*     |       |       |       |       |       |       |       |       |       |     | 0.022 |
| 15.9412 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I**    |       |       |       |       |       |       |       |       |       |     | 0.033 |
| 16.2460 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***   |       |       |       |       |       |       |       |       |       |     | 0.069 |
| 16.5509 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.120 |
| 16.8558 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.171 |
| 17.1606 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.229 |
| 17.4655 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.290 |
| 7.7704  | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.361 |
| 8.0752  | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.451 |
| 18.3801 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.535 |
| 18.6850 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.620 |
| 18.9899 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.694 |
| 19.2947 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.743 |
| 19.5996 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.790 |
| 19.9045 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.835 |
| 20.2093 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.876 |
| 20.5142 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.914 |
| 20.8191 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.937 |
| 21.1239 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.965 |
| 21.4288 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.976 |
| 21.7337 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.990 |
| 22.0386 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 22.3434 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 22.3434 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MAX   |

|                    |      |            |         |
|--------------------|------|------------|---------|
| NO OBS-----        | 490  | STD ERROR- | 1.4690  |
| COEF OF VARIATION- | 0.08 | MEAN-----  | 18.6462 |
| KURTOSIS (BETA 2)- | 2.47 | MEDIAN---- | 18.5925 |
| PEARSONIAN SKEW--- | 0.23 | MODE-----  | 18.3039 |

PATH COST FOR NODE 30

|        | CFC    | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |       |
|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 3.4845 | I      | I   | I   | I   | I   | I   | I   | I   | I   | I   | I   | MIN   |
|        | I      |     |     |     |     |     |     |     |     |     |     | 0.0   |
| 3.4845 | I      |     |     |     |     |     |     |     |     |     |     | 0.004 |
| 3.5490 | I      |     |     |     |     |     |     |     |     |     |     | 0.006 |
| 3.6135 | I      |     |     |     |     |     |     |     |     |     |     | 0.020 |
|        | I*     |     |     |     |     |     |     |     |     |     |     |       |
| 3.6781 | I      |     |     |     |     |     |     |     |     |     |     | 0.029 |
|        | I*     |     |     |     |     |     |     |     |     |     |     |       |
| 3.7426 | I      |     |     |     |     |     |     |     |     |     |     | 0.059 |
|        | I***   |     |     |     |     |     |     |     |     |     |     |       |
| 3.8071 | I      |     |     |     |     |     |     |     |     |     |     | 0.092 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 3.8717 | I      |     |     |     |     |     |     |     |     |     |     | 0.137 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 3.9362 | I      |     |     |     |     |     |     |     |     |     |     | 0.180 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.0007 | I      |     |     |     |     |     |     |     |     |     |     | 0.259 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.0653 | I      |     |     |     |     |     |     |     |     |     |     | 0.329 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.1298 | I      |     |     |     |     |     |     |     |     |     |     | 0.394 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.1943 | I      |     |     |     |     |     |     |     |     |     |     | 0.473 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.2589 | I      |     |     |     |     |     |     |     |     |     |     | 0.569 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.3234 | I      |     |     |     |     |     |     |     |     |     |     | 0.659 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.3879 | I      |     |     |     |     |     |     |     |     |     |     | 0.733 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.4525 | I      |     |     |     |     |     |     |     |     |     |     | 0.822 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.5170 | I      |     |     |     |     |     |     |     |     |     |     | 0.886 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.5815 | I      |     |     |     |     |     |     |     |     |     |     | 0.927 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.6461 | I      |     |     |     |     |     |     |     |     |     |     | 0.951 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.7106 | I      |     |     |     |     |     |     |     |     |     |     | 0.978 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.7751 | I      |     |     |     |     |     |     |     |     |     |     | 0.990 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.8397 | I      |     |     |     |     |     |     |     |     |     |     | 1.000 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.9042 | I      |     |     |     |     |     |     |     |     |     |     | 1.000 |
|        | I***** |     |     |     |     |     |     |     |     |     |     |       |
| 4.9042 | I      | I   | I   | I   | I   | I   | I   | I   | I   | I   | I   | MAX   |

|                    |      |            |        |
|--------------------|------|------------|--------|
| NO OBS-----        | 490  | STD ERROR- | 0.2750 |
| COEF OF VARIATION- | 0.06 | MEAN-----  | 4.2584 |
| KURTOSIS (BETA 2)- | 2.56 | MEDIAN---- | 4.2735 |
| PEARSONIAN SKEW--- | 0.17 | MODE-----  | 4.3058 |

OVERALL COST FOR NODE 30

CFD 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0  
 12.5148 I-----I-----I-----I-----I-----I-----I-----I-----I MIN  
 I 0.0  
 12.5148 I 0.002  
 I  
 12.7227 I 0.002  
 I  
 12.9307 I 0.002  
 I  
 13.1387 I 0.002  
 I  
 13.3467 I 0.002  
 I  
 13.5546 I 0.008  
 I  
 13.7626 I 0.008  
 I  
 13.9706 I 0.010  
 I\*  
 14.1785 I 0.020  
 I\*  
 14.3865 I 0.029  
 I\*  
 14.5945 I 0.047  
 I\*\*  
 14.8024 I 0.078  
 I\*\*\*\*  
 15.0104 I 0.122  
 I\*\*\*\*\*  
 15.2184 I 0.165  
 I\*\*\*\*\*  
 15.4263 I 0.253  
 I\*\*\*\*\*  
 15.6343 I 0.386  
 I\*\*\*\*\*  
 15.8423 I 0.533  
 I\*\*\*\*\*  
 16.0502 I 0.722  
 I\*\*\*\*\*  
 16.2582 I 0.867  
 I\*\*\*\*\*  
 16.4662 I 0.967  
 I\*\*\*\*\*  
 16.6741 I 0.988  
 I\*\*\*\*\*  
 16.8821 I 1.000  
 I\*\*\*\*\*  
 17.0901 I 1.000  
 I\*\*\*\*\*  
 17.0901 I-----I-----I-----I-----I-----I-----I-----I-----I MAX

NO OBS----- 490 STD ERROR- 0.5806  
 COEF OF VARIATION- 0.04 MEAN----- 15.8989  
 KURTCSIS (BETA 2)- 6.15 MEDIAN---- 15.9933  
 PEARSONIAN SKEW--- 0.44 MODE----- 16.1518

# NETWORK TIME FOR NODE SUCCESS

|         | CFD    | 0.1   | 0.2   | 0.3   | 0.4   | 0.5   | 0.6   | 0.7   | 0.8   | 0.9   | 1.0 |       |
|---------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 20.3718 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MIN   |
|         | I      |       |       |       |       |       |       |       |       |       |     | 0.0   |
| 20.3718 | I      |       |       |       |       |       |       |       |       |       |     | 0.005 |
|         | I      |       |       |       |       |       |       |       |       |       |     |       |
| 20.7018 | I      |       |       |       |       |       |       |       |       |       |     | 0.026 |
|         | I*     |       |       |       |       |       |       |       |       |       |     |       |
| 21.0317 | I      |       |       |       |       |       |       |       |       |       |     | 0.043 |
|         | I**    |       |       |       |       |       |       |       |       |       |     |       |
| 21.3616 | I      |       |       |       |       |       |       |       |       |       |     | 0.069 |
|         | I***   |       |       |       |       |       |       |       |       |       |     |       |
| 21.6916 | I      |       |       |       |       |       |       |       |       |       |     | 0.107 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 22.0215 | I      |       |       |       |       |       |       |       |       |       |     | 0.182 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 22.3515 | I      |       |       |       |       |       |       |       |       |       |     | 0.248 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 22.6814 | I      |       |       |       |       |       |       |       |       |       |     | 0.335 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 23.0114 | I      |       |       |       |       |       |       |       |       |       |     | 0.419 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 23.3413 | I      |       |       |       |       |       |       |       |       |       |     | 0.501 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 23.6712 | I      |       |       |       |       |       |       |       |       |       |     | 0.586 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 24.0012 | I      |       |       |       |       |       |       |       |       |       |     | 0.675 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 24.3311 | I      |       |       |       |       |       |       |       |       |       |     | 0.731 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 24.6611 | I      |       |       |       |       |       |       |       |       |       |     | 0.770 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 24.9910 | I      |       |       |       |       |       |       |       |       |       |     | 0.831 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 25.3209 | I      |       |       |       |       |       |       |       |       |       |     | 0.880 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 25.6509 | I      |       |       |       |       |       |       |       |       |       |     | 0.905 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 25.9808 | I      |       |       |       |       |       |       |       |       |       |     | 0.934 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 26.3108 | I      |       |       |       |       |       |       |       |       |       |     | 0.946 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 26.6407 | I      |       |       |       |       |       |       |       |       |       |     | 0.957 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 26.9706 | I      |       |       |       |       |       |       |       |       |       |     | 0.992 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 27.3006 | I      |       |       |       |       |       |       |       |       |       |     | 1.000 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 27.6307 | I      |       |       |       |       |       |       |       |       |       |     | 1.000 |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 27.6307 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MAX   |

|                    |      |            |         |
|--------------------|------|------------|---------|
| NO OBS-----        | 391  | STD ERROR- | 1.5285  |
| COEF OF VARIATION- | 0.06 | MEAN-----  | 23.7851 |
| KURTOSIS (BETA 2)- | 2.64 | MEDIAN---- | 23.6707 |
| PEARSONIAN SKEW--- | 0.17 | MODE-----  | 24.0452 |



PATH COST FOR NODE SUCCESS

|         | CFD    | 0.1   | 0.2   | 0.3   | 0.4   | 0.5   | 0.6   | 0.7   | 0.8   | 0.9   | 1.0 |       |
|---------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 16.1015 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MIN   |
|         | I      |       |       |       |       |       |       |       |       |       |     | 0.0   |
| 16.1015 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I      |       |       |       |       |       |       |       |       |       |     | 0.008 |
| 16.2031 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I*     |       |       |       |       |       |       |       |       |       |     | 0.020 |
| 16.3047 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I**    |       |       |       |       |       |       |       |       |       |     | 0.036 |
| 16.4063 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***   |       |       |       |       |       |       |       |       |       |     | 0.054 |
| 16.5079 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I****  |       |       |       |       |       |       |       |       |       |     | 0.087 |
| 16.6095 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.118 |
| 16.7111 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.174 |
| 16.8127 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.248 |
| 16.9143 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.325 |
| 17.0159 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.435 |
| 17.1176 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.519 |
| 17.2192 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.611 |
| 17.3208 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.698 |
| 17.4224 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.775 |
| 17.5240 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.849 |
| 17.6256 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.928 |
| 17.7272 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.957 |
| 17.8288 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.972 |
| 17.9304 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.990 |
| 18.0320 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.992 |
| 18.1336 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.995 |
| 18.2352 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 18.3369 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 18.3369 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MAX   |

|                    |      |            |         |
|--------------------|------|------------|---------|
| NO OBS-----        | 351  | STD ERROR- | 0.4061  |
| COEF OF VARIATION- | 0.02 | MEAN-----  | 17.1884 |
| KURTOSIS (BETA 2)- | 2.77 | MEDIAN---- | 17.1893 |
| PEARSONIAN SKEW--- | 0.28 | MODE-----  | 17.0734 |

OVERALL COST FOR NODE SUCCESS

| CFD     | 0.1    | 0.2   | 0.3   | 0.4   | 0.5   | 0.6   | 0.7   | 0.8   | 0.9   | 1.0   |       |
|---------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 16.1015 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | MIN   |
|         | I      |       |       |       |       |       |       |       |       |       | 0.0   |
| 16.1015 | I      |       |       |       |       |       |       |       |       |       | 0.008 |
|         | I      |       |       |       |       |       |       |       |       |       |       |
| 16.2031 | I      |       |       |       |       |       |       |       |       |       | 0.020 |
|         | I*     |       |       |       |       |       |       |       |       |       |       |
| 16.3047 | I      |       |       |       |       |       |       |       |       |       | 0.036 |
|         | I**    |       |       |       |       |       |       |       |       |       |       |
| 16.4063 | I      |       |       |       |       |       |       |       |       |       | 0.054 |
|         | I***   |       |       |       |       |       |       |       |       |       |       |
| 16.5079 | I      |       |       |       |       |       |       |       |       |       | 0.087 |
|         | I****  |       |       |       |       |       |       |       |       |       |       |
| 16.6095 | I      |       |       |       |       |       |       |       |       |       | 0.118 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 16.7111 | I      |       |       |       |       |       |       |       |       |       | 0.174 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 16.8127 | I      |       |       |       |       |       |       |       |       |       | 0.248 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 16.9143 | I      |       |       |       |       |       |       |       |       |       | 0.325 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 17.0159 | I      |       |       |       |       |       |       |       |       |       | 0.435 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 17.1176 | I      |       |       |       |       |       |       |       |       |       | 0.519 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 17.2192 | I      |       |       |       |       |       |       |       |       |       | 0.611 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 17.3208 | I      |       |       |       |       |       |       |       |       |       | 0.698 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 17.4224 | I      |       |       |       |       |       |       |       |       |       | 0.775 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 17.5240 | I      |       |       |       |       |       |       |       |       |       | 0.849 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 17.6256 | I      |       |       |       |       |       |       |       |       |       | 0.928 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 17.7272 | I      |       |       |       |       |       |       |       |       |       | 0.957 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 17.8288 | I      |       |       |       |       |       |       |       |       |       | 0.972 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 17.9304 | I      |       |       |       |       |       |       |       |       |       | 0.990 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 18.0320 | I      |       |       |       |       |       |       |       |       |       | 0.992 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 18.1336 | I      |       |       |       |       |       |       |       |       |       | 0.995 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 18.2352 | I      |       |       |       |       |       |       |       |       |       | 1.000 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 18.3369 | I      |       |       |       |       |       |       |       |       |       | 1.000 |
|         | I***** |       |       |       |       |       |       |       |       |       |       |
| 18.3369 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | MAX   |

|                    |      |            |         |
|--------------------|------|------------|---------|
| NO OBS-----        | 391  | STD ERROR- | 0.4061  |
| COEF OF VARIATION- | 0.02 | MEAN-----  | 17.1884 |
| KURTOSIS (BETA 2)- | 2.77 | MEDIAN---- | 17.1893 |
| PEARSONIAN SKEW--- | 0.28 | MODE-----  | 17.0734 |

# NETWORK TIME FOR NODE FAIL

|         | CFC | 0.1   | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |       |
|---------|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 0.0     | I   | I     | I   | I   | I   | I   | I   | I   | I   | I   | I   | MIN   |
|         | I   |       |     |     |     |     |     |     |     |     |     | 0.0   |
| 0.0     | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.394 |
| 0.5273  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.431 |
| 1.8545  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.431 |
| 2.7818  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.431 |
| 3.7090  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.495 |
| 4.6363  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.523 |
| 5.5635  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.596 |
| 6.4908  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.624 |
| 7.4180  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.661 |
| 8.3453  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.679 |
| 9.2725  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.688 |
| 10.1998 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.688 |
| 11.1270 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.688 |
| 12.0543 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.706 |
| 12.9815 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.752 |
| 13.9088 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.890 |
| 14.8360 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.917 |
| 15.7633 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.945 |
| 16.6905 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.963 |
| 17.6178 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.972 |
| 18.5450 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.982 |
| 19.4722 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 1.000 |
| 20.3995 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 1.000 |
| 20.3995 | I   | I     | I   | I   | I   | I   | I   | I   | I   | I   | I   | MAX   |

|                    |      |            |        |
|--------------------|------|------------|--------|
| NO OBS-----        | 105  | STD ERROR- | 6.5741 |
| COEF OF VARIATION- | 1.03 | MEAN-----  | 6.3619 |
| KURTOSIS (BETA 2)- | 1.72 | MEDIAN---- | 4.8041 |
| PEARSONIAN SKEW--- | 0.89 | MODE-----  | 0.4862 |

PATH COST FOR NOCE FAIL

|        | CFD   | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |       |
|--------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 0.0    | I-----I-----I-----I-----I-----I-----I-----I-----I-----I |     |     |     |     |     |     |     |     |     |     | MIN   |
|        | I   |     |     |     |     |     |     |     |     |     |     | 0.0   |
| 0.0    | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.394 |
| 0.2103 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.413 |
| 0.4206 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.486 |
| 0.6309 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.514 |
| 0.8412 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.587 |
| 1.0515 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.596 |
| 1.2618 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.624 |
| 1.4720 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.670 |
| 1.6823 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.670 |
| 1.8926 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.670 |
| 2.1029 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.670 |
| 2.3132 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.688 |
| 2.5235 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.688 |
| 2.7338 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.688 |
| 2.9441 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.688 |
| 3.1544 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.688 |
| 3.3647 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.688 |
| 3.5750 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.706 |
| 3.7853 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.780 |
| 3.9955 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.872 |
| 4.2058 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 0.927 |
| 4.4161 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 1.000 |
| 4.6264 | I   |     |     |     |     |     |     |     |     |     |     |       |
|        | I*****  |     |     |     |     |     |     |     |     |     |     | 1.000 |
| 4.6264 | I-----I-----I-----I-----I-----I-----I-----I-----I-----I |     |     |     |     |     |     |     |     |     |     | MAX   |

|                    |      |            |        |
|--------------------|------|------------|--------|
| NO OBS-----        | 109  | STD ERROR- | 1.8174 |
| COEF OF VARIATION- | 1.14 | MEAN-----  | 1.6007 |
| KURTOSIS (BETA 2)- | 1.59 | MEDIAN---- | 0.6416 |
| PEARSONIAN SKEW--- | 0.82 | MODE-----  | 0.1076 |

OVERALL COST FOR NODE FAIL

|         | CFD | 0.1  | 0.2 | 0.3  | 0.4 | 0.5  | 0.6 | 0.7  | 0.8 | 0.9  | 1.0 |       |
|---------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|-------|
| 0.0     | I   | ---- | I   | ---- | I   | ---- | I   | ---- | I   | ---- | I   | MIN   |
| 0.0     | I   |      |     |      |     |      |     |      |     |      |     | 0.0   |
| 0.7410  | I   |      |     |      |     |      |     |      |     |      |     | 0.394 |
| 1.4820  | I   |      |     |      |     |      |     |      |     |      |     | 0.394 |
| 2.2230  | I   |      |     |      |     |      |     |      |     |      |     | 0.394 |
| 2.9639  | I   |      |     |      |     |      |     |      |     |      |     | 0.394 |
| 3.7049  | I   |      |     |      |     |      |     |      |     |      |     | 0.394 |
| 4.4459  | I   |      |     |      |     |      |     |      |     |      |     | 0.394 |
| 5.1869  | I   |      |     |      |     |      |     |      |     |      |     | 0.394 |
| 5.9279  | I   |      |     |      |     |      |     |      |     |      |     | 0.394 |
| 6.6689  | I   |      |     |      |     |      |     |      |     |      |     | 0.394 |
| 7.4099  | I   |      |     |      |     |      |     |      |     |      |     | 0.422 |
| 8.1508  | I   |      |     |      |     |      |     |      |     |      |     | 0.431 |
| 8.8918  | I   |      |     |      |     |      |     |      |     |      |     | 0.477 |
| 9.6328  | I   |      |     |      |     |      |     |      |     |      |     | 0.615 |
| 10.3738 | I   |      |     |      |     |      |     |      |     |      |     | 0.661 |
| 11.1148 | I   |      |     |      |     |      |     |      |     |      |     | 0.670 |
| 11.8558 | I   |      |     |      |     |      |     |      |     |      |     | 0.688 |
| 12.5967 | I   |      |     |      |     |      |     |      |     |      |     | 0.706 |
| 13.3377 | I   |      |     |      |     |      |     |      |     |      |     | 0.881 |
| 14.0787 | I   |      |     |      |     |      |     |      |     |      |     | 0.917 |
| 14.8197 | I   |      |     |      |     |      |     |      |     |      |     | 0.927 |
| 15.5607 | I   |      |     |      |     |      |     |      |     |      |     | 1.000 |
| 16.3017 | I   |      |     |      |     |      |     |      |     |      |     | 1.000 |
| 16.3017 | I   | ---- | I   | ---- | I   | ---- | I   | ---- | I   | ---- | I   | MAX   |

|                    |      |            |        |
|--------------------|------|------------|--------|
| NO OBS-----        | 109  | STD ERROR- | 6.2884 |
| COEF OF VARIATION- | 0.85 | MEAN-----  | 7.4072 |
| KURTOSIS (BETA 2)- | 1.31 | MEDIAN---- | 9.8215 |
| PEARSONIAN SKEW--- | 1.12 | MODE-----  | 0.3705 |

# NETWORK TIME FOR THE COMPOSITE TERMINAL NODE

|         | CFD    | 0.1   | 0.2   | 0.3   | 0.4   | 0.5   | 0.6   | 0.7   | 0.8   | 0.9   | 1.0 |       |
|---------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 0.0     | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MIN   |
| 0.0     | I      |       |       |       |       |       |       |       |       |       |     | 0.0   |
|         | I****  |       |       |       |       |       |       |       |       |       |     | 0.086 |
| 1.2559  | I      |       |       |       |       |       |       |       |       |       |     | 0.094 |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.096 |
| 2.5119  | I      |       |       |       |       |       |       |       |       |       |     | 0.110 |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.124 |
| 3.7678  | I      |       |       |       |       |       |       |       |       |       |     | 0.140 |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.146 |
| 5.0238  | I      |       |       |       |       |       |       |       |       |       |     | 0.150 |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.150 |
| 6.2797  | I      |       |       |       |       |       |       |       |       |       |     | 0.164 |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.196 |
| 7.5356  | I      |       |       |       |       |       |       |       |       |       |     | 0.200 |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.210 |
| 8.7916  | I      |       |       |       |       |       |       |       |       |       |     | 0.214 |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.216 |
| 10.0475 | I      |       |       |       |       |       |       |       |       |       |     | 0.252 |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.402 |
| 11.3035 | I      |       |       |       |       |       |       |       |       |       |     | 0.658 |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 0.838 |
| 12.5594 | I      |       |       |       |       |       |       |       |       |       |     | 0.948 |
|         | I***** |       |       |       |       |       |       |       |       |       |     | 1.000 |
| 13.8153 | I      |       |       |       |       |       |       |       |       |       |     | 1.000 |
|         | I***** |       |       |       |       |       |       |       |       |       |     | MAX   |
| 15.0713 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 16.3272 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 17.5832 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 18.8391 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 20.0950 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 21.3510 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 22.6069 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 23.8628 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 25.1188 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 26.3747 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 27.6307 | I      |       |       |       |       |       |       |       |       |       |     |       |
|         | I***** |       |       |       |       |       |       |       |       |       |     |       |
| 27.6307 | I----  | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I---- | I   | MAX   |

|                    |      |            |         |
|--------------------|------|------------|---------|
| NO OBS-----        | 500  | STD ERROR- | 7.9398  |
| COEF OF VARIATION- | 0.40 | MEAN-----  | 19.9867 |
| KURTOSIS (BETA 2)- | 4.36 | MEDIAN---- | 23.1189 |
| PEARSONIAN SKEW--- | 0.42 | MODE-----  | 23.3384 |

PATH COST FOR THE COMPOSITE TERMINAL NCDE

|         | CFD | 0.1   | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |       |
|---------|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 0.0     | I   | I     | I   | I   | I   | I   | I   | I   | I   | I   | I   | MIN   |
|         | I   |       |     |     |     |     |     |     |     |     |     | 0.0   |
| 0.0     | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.112 |
| 0.8335  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.146 |
| 1.6670  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.150 |
| 2.5005  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.150 |
| 3.3340  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.188 |
| 4.1675  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.218 |
| 5.0010  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.218 |
| 5.8345  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.218 |
| 6.6680  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.218 |
| 7.5015  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.218 |
| 8.3350  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.218 |
| 9.1685  | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.218 |
| 10.0020 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.218 |
| 10.8354 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.218 |
| 11.6689 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.218 |
| 12.5024 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.218 |
| 13.3359 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.218 |
| 14.1694 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.218 |
| 15.0029 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.218 |
| 15.8364 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.296 |
| 16.6699 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 0.810 |
| 17.5034 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 1.000 |
| 18.3369 | I   |       |     |     |     |     |     |     |     |     |     |       |
|         | I   | ***** |     |     |     |     |     |     |     |     |     | 1.000 |
| 18.3369 | I   | I     | I   | I   | I   | I   | I   | I   | I   | I   | I   | MAX   |

|                    |      |            |         |
|--------------------|------|------------|---------|
| NO OBS-----        | 500  | STD ERROR- | 6.5078  |
| COEF OF VARIATION- | 0.47 | MEAN-----  | 13.7901 |
| KURTOSIS (BETA 2)- | 3.09 | MEDIAN---- | 17.0466 |
| PEARSONIAN SKEW--- | 0.52 | MODE-----  | 17.1481 |

# OVERALL COST FOR THE COMPOSITE TERMINAL NODE

|         | CFD    | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |       |
|---------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 0.0     | I      | I   | I   | I   | I   | I   | I   | I   | I   | I   | I   | MIN   |
|         | I      |     |     |     |     |     |     |     |     |     |     | 0.0   |
| 0.0     | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I****  |     |     |     |     |     |     |     |     |     |     | 0.086 |
| 0.833E  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I****  |     |     |     |     |     |     |     |     |     |     | 0.086 |
| 1.6670  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I****  |     |     |     |     |     |     |     |     |     |     | 0.086 |
| 2.5005  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I****  |     |     |     |     |     |     |     |     |     |     | 0.086 |
| 3.3340  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I****  |     |     |     |     |     |     |     |     |     |     | 0.086 |
| 4.1675  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I****  |     |     |     |     |     |     |     |     |     |     | 0.086 |
| 5.0010  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I****  |     |     |     |     |     |     |     |     |     |     | 0.086 |
| 5.834E  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I****  |     |     |     |     |     |     |     |     |     |     | 0.086 |
| 6.6680  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I****  |     |     |     |     |     |     |     |     |     |     | 0.086 |
| 7.5015  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.094 |
| 8.3350  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.094 |
| 9.1685  | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.118 |
| 10.0020 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.142 |
| 10.8354 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.146 |
| 11.6689 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.150 |
| 12.5024 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.154 |
| 13.3359 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.194 |
| 14.1694 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.202 |
| 15.0029 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.210 |
| 15.8364 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.296 |
| 16.6699 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 0.810 |
| 17.5034 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 1.000 |
| 18.3369 | I      |     |     |     |     |     |     |     |     |     |     |       |
|         | I***** |     |     |     |     |     |     |     |     |     |     | 1.000 |
| 18.3369 | I      | I   | I   | I   | I   | I   | I   | I   | I   | I   | I   | MAX   |

|                    |      |            |         |
|--------------------|------|------------|---------|
| NO OBS-----        | 500  | STD ERROR- | 5.0031  |
| COEF OF VARIATION- | 0.33 | MEAN-----  | 15.0559 |
| KURTOSIS (BETA 2)- | 7.18 | MEDIAN---- | 17.0466 |
| PEARSONIAN SKEW--- | 0.42 | MODE-----  | 17.1443 |

PATH PERFORMANCE FOR THE COMPOSITE TERMINAL NODE  
 NO CBS = 500 AVC = 0.0



```
OPTIMUM TERMINAL NODE INDEX - NO. ITERATIONS = 500
      0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
SUCCESS 0.7820 I-----+-----+-----+-----+-----+-----+I
               I*****I*****I*****I*****I*****I*****I*****I
               I    +       +       +       +       +       +       +I
FAIL     0.2180 I*****I*****I*****I*****I*****I*****I*****I
               I-----+-----+-----+-----+-----+-----+I
              0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
```

0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

NODES CRITICAL-OPTIMUM PATH INDEX - NO. PATHS = 500

|         |        | NO. PATTS |     |     |     |     |     |     |     |     |     |     |
|---------|--------|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|         |        | 0.1       | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |     |
|         |        | I-----+I  |     |     |     |     |     |     |     |     |     |     |
| START   | 1.0000 | I*****I   |     |     |     |     |     |     |     |     |     |     |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 1       | 0.0500 | I**       |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 2       | 0.0320 | I**       |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 3       | 0.0040 | I         |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 4       | 0.0360 | I**       |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 5       | 0.0200 | I*        |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 6       | 0.0140 | I*        |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 7       | 0.0100 | I         |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 11      | 0.0340 | I**       |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 12      | 0.8000 | I*****I   |     |     |     |     |     |     |     |     |     |     |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 14      | 0.0120 | I*        |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 15      | 0.0240 | I*        |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 16      | 0.0140 | I*        |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 18      | 0.0040 | I         |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 19      | 0.0040 | I         |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 20      | 0.0220 | I*        |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 22      | 0.0040 | I         |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 23      | 0.0160 | I*        |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 24      | 0.0140 | I*        |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 27      | 0.0500 | I**       |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 28      | 0.8000 | I*****I   |     |     |     |     |     |     |     |     |     |     |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 29      | 0.0500 | I**       |     |     |     |     |     |     |     |     |     | I   |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 30      | 0.8000 | I*****I   |     |     |     |     |     |     |     |     |     |     |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| 38      | 0.7820 | I*****I   |     |     |     |     |     |     |     |     |     |     |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| SUCCESS | 0.7820 | I*****I   |     |     |     |     |     |     |     |     |     |     |
|         |        | I         | +   | +   | +   | +   | +   | +   | +   | +   | +   | I   |
| FAIL    | 0.2180 | I*****I   |     |     |     |     |     |     |     |     |     |     |
|         |        | I-----+I  |     |     |     |     |     |     |     |     |     |     |
|         |        |           | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |

[illegible]



APPENDIX H

SAMPLE SESSION NUMBER 3:

CREATE A VERT INPUT DATA FILE,

DEBUG, AND GRAPH

(Tektronix 4054 Graphics Terminal)<sup>1</sup>

-

<sup>1</sup> The Tektronix 4054 Graphics Terminal emulates a Tektronix 4014 Graphics Terminal.

CALL "RATE",2400,0.2 ← Set baud rate  
CHARSIZE 3 ← set character size to 80 characters  
CALL "TERMIN" per line.

enter class 116611  
class 161 stor1  
CMS6  
READY-TO-IBM

S+E VM/SP ONLINE

! ← Depress "RETURN" button

.LOG FPKERLY

restor1

.LOG FPKERLY

ENTER PASSWORD,

.00000000

} Enter userid and password

LOGMSG - 00:58:45 CDT TUESDAY 07/20/82

\*THE 3705 WILL BETAKEN OFFLINE AT 1200 HRS CDT 7/20/82. UNTIL

\*FURTHER NOTICE ALL LINES WILL GO THRU THE COMTEN. THE ONLY

\*VALID PACX CLASSES ARE 160-162; 160 = 300-1800 BPS, 161 = 2400-4800 BPS

\* AND 162 = 9600 BPS.

LOGON AT 06:31:49 CDT THURSDAY 07/22/82

MIDWEST S+E COMPUTER CENTER

. ← Depress "RETURN" button

Y (19E) R/O

CMSZER SYSTEM NAME 'CMSZER' NOT AVAILABLE.

CMSSEG SYSTEM NAME 'CMSSEG' NOT AVAILABLE.

DASD 291 DEFINED

'19E' REPLACES ' Y (19E) '

Y (19E) R/O

E (194) R/O

R; ← CMS "READY" mode

THIS PAGE DEPICTS LOGGING ON  
THE COMPUTER TERMINAL (TEKTRONIX  
4054 COMPUTER GRAPHICS TERMINAL)  
AND GETTING INTO CMS "READY"  
MODE.

UNLESS OTHERWISE STATED ALL PAGES  
IN THIS SESSION WERE CREATED  
BY MANUALLY DEPRESSING THE "PAGE"  
BUTTON ON THE COMPUTER TERMINAL.  
EACH PAGE IS AN ACTUAL PICTURE  
OF THE COMPUTER GRAPHICS TERMINAL  
CRT SCREEN.

**VERTEX** ← Enter the name of the executive file which runs  
**E: (194) R/O** the menu technique.

**MAIN MENU LEVEL, ENTER THE OPTION DESIRED ,**

- 1 = RUN VERT ONLINE**
- 2 = RUN VERT OFFLINE (CMS BATCH)**
- 3 = VIEW VERT OUTPUT**
- 4 = CREATE A VERT INPUT FILE**
- 5 = EDIT AN EXISTING VERT INPUT FILE**
- 6 = GET VERT NETWORK PLOT MENU**
- 7 = GET VERT GRAPH MENU**
- LIST = GET VERT DATASETS DISPLAY LISTING MENU**
- END = END THE SESSION**

H-3

**4** ← Item 4 is Selected

**NOTE:** Be sure to wait for the period before entering data at all times. The period is a CMS convention for signalling the user that the computer is waiting for data to be entered by the user.

NOTE: IN ORDER TO BE ABLE TO RUN VERT OFFLINE, THE FIRST TWO LETTERS OF THE VERT INPUT FILENAME MUST BEGIN WITH VI. THE REMAINING SIX MAX ALPHANUMERIC CHARACTERS MAY BE ANYTHING YOU WISH.

DO YOU WISH TO USE FREE FORM OR FIXED FORM FORMAT FOR CREATING YOUR VERT INPUT FILE ? ENTER THE OPTION NUMBER LISTED BELOW.

1 -> FREE FORM (FIELDS ARE SEPARATED BY COMMAS. THUS ARC OR NODE NAMES MUST NOT CONTAIN COMMAS IN THE NAME. WHEN A FIELD IS NOT USED IT'S ABSENCE MUST BE INDICATED BY A COMMA IF IT IS FOLLOWED BY ANOTHER FIELD. THE PROGRAM WILL PROMPT THE USER FOR DATA)

2 -> FIXED FORM (USE THE TABSET COMMAND TO AID INPUT)

.1 ← Free form format is selected (Depress "PAGE" button before Depressing the "RETURN" button on your terminal to complete the entry of the value "1")



ENTER VERT INPUT FILE NAME

.VIFACTS ← Name selected for the new VERT input file to be created

ENTER THE CONTROL CARD

THE NEXT LINE OF DATA IS LINE NUMBER 1

.1,4,,,,,,,,435459,2,,,,1.0,,,1.0

Only 2 iterations is requested to save time since this data file has not been debugged.

ENTER THE PROBLEM IDENTIFICATION CARD

THE NEXT LINE OF DATA IS LINE NUMBER 2

.SHORT VERSION OF FACTS/ITMS RUN

ENTER THE MASTER AND SATELLITE ARC CARDS, FINISH WITH "ENDARC"

THE NEXT LINE OF DATA IS LINE NUMBER 3

.DEL FACT,START,FACEPTED,1.0,,DELIVER FACTS ← Master arc card

THE NEXT LINE OF DATA IS LINE NUMBER 4

.DEL FACT,DTIME,1,1.0,3.5 ← Satellite arc card

THE NEXT LINE OF DATA IS LINE NUMBER 5

.DEL ITMS,START,IACEPTED,1.0,,DELIVER ITMS

THE NEXT LINE OF DATA IS LINE NUMBER 6

.DEL ITMS,DTIME,1,1.0,3.5

THE NEXT LINE OF DATA IS LINE NUMBER 7

.DEL AC,START,BHTACPT,1.0,,DELIVER AIRCRAFT

THE NEXT LINE OF DATA IS LINE NUMBER 8

.DEL AC,DTIME,1,1.0,5.0

THE NEXT LINE OF DATA IS LINE NUMBER 9  
.FDESGN,FACEPTED,FIJOINED,1.0,,DEVELOP AND DESIGN FACTS

THE NEXT LINE OF DATA IS LINE NUMBER 10  
.FDESGN,DTIME,1,3.0,9.0,18.0,12.0

THE NEXT LINE OF DATA IS LINE NUMBER 11  
.FDESGN,M,1,.99

*"M" should have been followed by 4 blank spaces (M b b b b). This omission here and elsewhere in the file will cause the computer to bomb the run.*

THE NEXT LINE OF DATA IS LINE NUMBER 12  
.FDESGNF,FACEPTED,FAIL,1.0,,FAIL FACTS DEVELOPMENT AND DESIGN

THE NEXT LINE OF DATA IS LINE NUMBER 13  
.FDESGNF,M,1,.01

THE NEXT LINE OF DATA IS LINE NUMBER 14  
.HACSUB,IACEPTED,HACWINS,1.0,,CONTRACTOR 1 SUBMITS ITMS DESIGN PROPOSAL

THE NEXT LINE OF DATA IS LINE NUMBER 15  
.HACSUB,M,1,.75

THE NEXT LINE OF DATA IS LINE NUMBER 16  
.TISUB,IACEPTED,TIWINS,1.0,,CONTRACTOR 2 SUBMITS ITMS DESIGN PROPOSAL

THE NEXT LINE OF DATA IS LINE NUMBER 17  
.TISUB,M,1,.25

THE NEXT LINE OF DATA IS LINE NUMBER 18  
.HACIDES,HACWINS,DESCOMP,1.0,,CONTRACTOR 1 DESIGNS ITMS

THE NEXT LINE OF DATA IS LINE NUMBER 19  
.HACIDES,DTIME,1,3.0,10.0,20.0,14.0

THE NEXT LINE OF DATA IS LINE NUMBER 20  
.HACIDES,M,1,.9

THE NEXT LINE OF DATA IS LINE NUMBER 21  
.HACFAIL,HACWINS,FAIL,1.0,,CONTRACTOR 1 ITMS DESIGN FAILS

THE NEXT LINE OF DATA IS LINE NUMBER 22  
.HACFAIL,M,1,.1

THE NEXT LINE OF DATA IS LINE NUMBER 23  
.TIDES,TIWINS,DESCOMP,1.0,,CONTRACTOR 2 DESIGNS ITMS

THE NEXT LINE OF DATA IS LINE NUMBER 24  
.TIDES,DTIME,1,3.0,8.0,16.0,10.0

THE NEXT LINE OF DATA IS LINE NUMBER 25  
.TIDES,M,1,.95 ←

THE NEXT LINE OF DATA IS LINE NUMBER 26  
.TIFAIL,TIWINS,FAIL,1.0,,CONTRACTOR 2 ITMS DESIGN FAILS .

THE NEXT LINE OF DATA IS LINE NUMBER 27  
.TIFAIL,M,1,.07 ←

An error will occur since  
it is required that these  
2 numbers must sum to 1.0

THE NEXT LINE OF DATA IS LINE NUMBER 28  
.DOCUMNT,BHTACPT,DRWACPT,1.0,,DEVELOP INTERFACE CONTROL DOCUMENT

THE NEXT LINE OF DATA IS LINE NUMBER 29  
.DOCUMNT,DTIME,1,1.0,3.5

THE NEXT LINE OF DATA IS LINE NUMBER 30  
.DOCUMNT,M,1,.00

THE NEXT LINE OF DATA IS LINE NUMBER 31  
.DOCFAIL,BHTACPT,FAIL,1.0,,FAIL DEVELOPMENT OF INTERFACE CONTROL DOCUMENT

THE NEXT LINE OF DATA IS LINE NUMBER 32  
.DOCFAIL,M,1,.01

THE NEXT LINE OF DATA IS LINE NUMBER 33  
.ICOMBND,DESCOMP,FIJOINED,1.0,,ITMS DESIGN IS COMPLETED

THE NEXT LINE OF DATA IS LINE NUMBER 34  
.IDRAWDEL,FIJOINED,DRWACPT,1.0,,ITMS DRAWINGS DELIVERED

THE NEXT LINE OF DATA IS LINE NUMBER 35  
.IDRAWDEL,DTIME,1,1.0,2.0

THE NEXT LINE OF DATA IS LINE NUMBER 36  
.DUMMY1,FIJOINED,STFAB,1.0,,DUMMY ARC FOR COMPUTER PURPOSES ONLY

THE NEXT LINE OF DATA IS LINE NUMBER 37  
.FAB,STFAB,FABCOMP,1.0,,FABRICATE FACTS/ITMS

THE NEXT LINE OF DATA IS LINE NUMBER 38  
.FAB,DTIME,1,1.0,10.0

THE NEXT LINE OF DATA IS LINE NUMBER 39  
.FAB,M,1,.0

THE NEXT LINE OF DATA IS LINE NUMBER 40  
.FABFAIL,STFAB,FAIL,1.0,,FABRICATION FAILS

THE NEXT LINE OF DATA IS LINE NUMBER 41  
.FABFAIL,M,1,.1

THE NEXT LINE OF DATA IS LINE NUMBER 42  
.BTEST,FABCOMP,BTCOMP,1.0,,BENCH/QUALIFICATION TESTING

THE NEXT LINE OF DATA IS LINE NUMBER 43  
.BTEST,DTIME,1,3.0,3.0,4.0,10.0

The word "QUALIFICATION" should not have been included to the description of this arc and will be removed from this description later in this appendix.

THE NEXT LINE OF DATA IS LINE NUMBER 44  
.BTEST,M,1,.9

THE NEXT LINE OF DATA IS LINE NUMBER 45  
.REDSGN,FABCOMP,RDCOMP,1.0,,REDESIGN FACTS/ITMS

THE NEXT LINE OF DATA IS LINE NUMBER 46  
.REDSGN,DTIME,1,1.0,5.5

THE NEXT LINE OF DATA IS LINE NUMBER 47  
.REDSGN,M,1,.1

THE NEXT LINE OF DATA IS LINE NUMBER 48  
.RTEST,RDCOMP,BTCOMP,1.0,,RE-DBSBEENCTEST

THE NEXT LINE OF DATA IS LINE NUMBER 49  
.RTEST,DTIME,1,1.0,3.25

Since this computer terminal is  
a "Storage - Tube" device, corrections  
are overwritten.

THE NEXT LINE OF DATA IS LINE NUMBER 50  
.OTEST,BTCOMP,OTCOMP,1.0,,QUALIFICATION TESTING OF FACTS/ITMS

THE NEXT LINE OF DATA IS LINE NUMBER 51  
.OTEST,DTIME,1,1.0,6.0

THE NEXT LINE OF DATA IS LINE NUMBER 52  
.OTEST,M,1,.9

THE NEXT LINE OF DATA IS LINE NUMBER 53  
.OTFAIL,BTCOMP,FAIL,1.0,,FAIL QUALIFICATION TESTING

THE NEXT LINE OF DATA IS LINE NUMBER 54  
.OTFAIL,M,1,.1

THE NEXT LINE OF DATA IS LINE NUMBER 55  
.DELPROT,OTCOMP,ISTART,1.0,,DELIVER PROTOTYPE

THE NEXT LINE OF DATA IS LINE NUMBER 56  
.DELPROT,DTIME,1,1.0,2.5

THE NEXT LINE OF DATA IS LINE NUMBER 57  
.DELPROT,M,1,.9

THE NEXT LINE OF DATA IS LINE NUMBER 58  
.SHIPFAIL,OTCOMP,FAIL,1.0,,FAIL TO SHIP PROROTYPE

THE NEXT LINE OF DATA IS LINE NUMBER 59  
.SHIPFAIL,M,1,.1

THE NEXT LINE OF DATA IS LINE NUMBER 60  
.A/C MOD,DRWACPT,ISTART,1.0,,MODIFY AIRCRAFT TO ACCEPT FACTS/ITMS

THE NEXT LINE OF DATA IS LINE NUMBER 61  
.A/C MOD,DTIME,1,1.0,4.0

THE NEXT LINE OF DATA IS LINE NUMBER 62  
.A/C MOD,M,1,.9

THE NEXT LINE OF DATA IS LINE NUMBER 63  
.MODFAIL,DRWACPT,FAIL,1.0,,FAIL AIRCRAFT MODIFICATION

THE NEXT LINE OF DATA IS LINE NUMBER 64  
.MODFAIL,M,1,.1

THE NEXT LINE OF DATA IS LINE NUMBER 65  
.INTGON,ISTART,ICOMP,1.0,,INTEGRATE FACTS/ITMS INTO AIRCRAFT

THE NEXT LINE OF DATA IS LINE NUMBER 66  
.INTGON,DTIME,1,1.0,3.0

THE NEXT LINE OF DATA IS LINE NUMBER 67  
.INTGON,M,1,.9

THE NEXT LINE OF DATA IS LINE NUMBER 68  
.INTFAIL,ISTART,FAIL,1.0,,FAIL INTEGRATION

THE NEXT LINE OF DATA IS LINE NUMBER 69  
.INTFAIL,M,1,,1

THE NEXT LINE OF DATA IS LINE NUMBER 70  
.DT/OT,ICOMP,DTCOMP,1.0,,DEVELOPMENT/OPERATIONAL TESTING

THE NEXT LINE OF DATA IS LINE NUMBER 71  
.DT/OT,DTIME,1,3.0,300,8.0,4.5

THE NEXT LINE OF DATA IS LINE NUMBER 72  
.DT/OT,M,1,,1

THE NEXT LINE OF DATA IS LINE NUMBER 73  
.ENDARC ← "ENDARC" terminates the arc entries

ENTER THE MASTER AND SATELLITE NODE CARDS, FINISH WITH "ENDNODE"

THE NEXT LINE OF DATA IS LINE NUMBER 74  
.START,1,2,,,,,,BEGIN NETWORK

THE NEXT LINE OF DATA IS LINE NUMBER 75  
.FACEPTED,2,3,,,,,,FACTS ACCEPTED

THE NEXT LINE OF DATA IS LINE NUMBER 76  
.IACEPTED,2,3,,,,,,ITMS ACCEPTED

THE NEXT LINE OF DATA IS LINE NUMBER 77  
.BHTACPT,2,3,,,,,,AIRCRAFT ACCEPTED

THE NEXT LINE OF DATA IS LINE NUMBER 78  
.HACWINS,2,3,,,,,,CONTRACTOR 1 WINS DESIGN CONTRACT



THE NEXT LINE OF DATA IS LINE NUMBER 79  
.IWIN,2,3,,,,,,,,CONTRACTOR 2 WINS DESIGN CONTRACT

THE NEXT LINE OF DATA IS LINE NUMBER 80  
.DESCOMP,4,2,,,,,,,,ITMS DESIGN COMPLETED  
07:46:43

MSG FROM OPERATOR: HAVE TO IPL AGAIN

THE NEXT LINE OF DATA IS LINE NUMBER 81  
.FIJOINED,2,2,,,,,,,,FACTS AND ITMS COMBINED

THE NEXT LINE OF DATA IS LINE NUMBER 82  
.DRWACPT,2,3,,,,,,,,DRAWINGS ACCEPTED

THE NEXT LINE OF DATA IS LINE NUMBER 83  
.STFAB,2,3,,,,,,,,BEGIN FABRICATION OF FACTS/ITMS

THE NEXT LINE OF DATA IS LINE NUMBER 84  
.FABCOMP,2,3,,,,,,,,FABRICATION COMPLETED

THE NEXT LINE OF DATA IS LINE NUMBER 85  
.RDCOMP,2,2,,,,,,,,RE-DESIGN COMPLETED

THE NEXT LINE OF DATA IS LINE NUMBER 86  
.BTCOMP,4,3,,,,,,,,BENCH TESTING COMPLETED

THE NEXT LINE OF DATA IS LINE NUMBER 87  
.OTCOMP,2,3,,,,,,,,QUALIFICATION TESTING COMPLETED

THE NEXT LINE OF DATA IS LINE NUMBER 88  
.ISTART,2,3,,,,,,,,BEGIN FACTS/ITMS INTEGRATION INTO AIRCRAFT

Fortunately, this message from the computer operator turned out to be a mistake. Had it not been, I would have been thrown out of this program and also out of CMS. After re-logging on, I then would have 2 options: One would be to start all over again. The other would be to rename the old data file and then continue inputting data where I had been forced to leave off when the computer went down. When finished, I could then merge the two data files together.



THE NEXT LINE OF DATA IS LINE NUMBER 89  
.ICOMP,2,3,,,,,,INTEGRATION COMPLETED

THE NEXT LINE OF DATA IS LINE NUMBER 90  
.DTCOMP,2,1,,,,,,DT/OT TESTING COMPLETED

THE NEXT LINE OF DATA IS LINE NUMBER 91

ENDNODE ← "ENDNODE" terminates the creation of the data file

MAIN MENU LEVEL: ENTER THE OPTION DESIRED

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU

LIST = GET VERT DATASETS DISPLAY LISTING MENU

END = END THE SESSION

If you desire to have this menu appear on a separate page, then depress the "PAGE" button on your terminal before completing the "ENDNODE" entry above.

.5 ← Item 5 is selected

ENTER FILENAME OF VERT INPUT FILE TO BE EDITED

.VIFACTS ← The file just created is now being edited

EDIT,

TOF,

./BTEST

BTEST FABCOMP BTCOMP 1.0 BENCH/QUALIFICATION TESTING

.CX/QUALIFICATIONXX

BTEST FABCOMP BTCOMP 1.0 BENCH TESTING

.FILE

← "FILE" makes the change permanent

OLD RECORD

NEW RECORD

The word "QUALIFICATION" is removed from the description of this arc

MAIN MENU LEVEL, ENTER THE OPTION DESIRED ,

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

H-15

.1 ← Item 1 is selected

DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ? ENTER YES/NO

.NO

ENTER VERT INPUT FILE NAME

.VIFACTS ←

*The file will now be debugged*

FI 05 DISK VIFACTS DATA A1

FI 06 DISK VOUTPUT AAAA A

FI 07 DISK VERTPUN AAAA A

FI 08 DISK VERT1 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )

FI 09 DISK VERT2 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )

FI 10 DISK VERT3 AAAA A ( LRECL 96 BLKSIZE 964 RECFM VBS )

FI 11 DISK VERT4 AAAA A ( LRECL 444 BLKSIZE 444 RECFM VBS )

VERTNEW

&CONTROL OFF

08.04.00

MSG FROM FPKERLY : YOUR JOB HAS FINISHED ← *Less than 30 seconds was required*

MAIN MENU LEVEL, ENTER THE OPTION DESIRED ,

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

H-17

.3

← The output from the debugging run  
just completed will be reviewed

DID YOU RUN VERT ONLINE ?

ENTER YES/NO

.YES

EDIT,

ENDNODE

EDIT,

.TOP

TOF,

./E R R O R

0 1. E R R O R NO. 1777

.T5

0 1. E R R O R NO. 1777

DELFACT START FACE DEL 1.0 DELIVER FACTS

DELFACT DTIME 1 0 3.5

DELITMS START IACE DEL 1.0 DELIVER ITMS

DELITMS DTIME 1 0 3.5

.QUIT

ENTER YES/NO FOR ROUTING

.NO

Find out if any errors occurred

Error Number 1777 indicates that something is wrong with the control card of the VERT input data file "VIFACTS". Others errors could still be hidden by this error.

Either "QUIT" or "FILE" can be used since this output file will not be edited.

I don't need a hardcopy listing of the output during debugging (usually)

E (194) R/O

MAIN MENU LEVEL, ENTER THE OPTION DESIRED

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

.5

Item 5 is selected in order to correct  
the error found in the control card  
from the debugging run just completed

ENTER FILENAME OF VERT INPUT FILE TO BE EDITED

.VIFACTS

EDIT,

TOF,

.T2

TOF,

14

435459

2

1.0

1.0

.C/4 / 4/

1 4

435459

2

1.0

1.0

.FILE

The "4" (VERT Output Type Option) was entered incorrectly as column 2 instead of column 3 during file creation



MAIN MENU LEVEL, ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

H-21

.1 ← VIFACTS is again being run to  
continue debugging

DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ? ENTER YES/NO

.NO

ENTER VERT INPUT FILE NAME

.VIFACTS

FI 05 DISK VIFACTS DATA AI

FI 06 DISK VOUTPUT AAAA A

FI 07 DISK VERTPUN AAAA A

FI 08 DISK VERT1 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )

FI 09 DISK VERT2 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )

FI 10 DISK VERT3 AAAA A ( LRECL 96 BLKSIZE 964 RECFM VBS )

FI 11 DISK VERT4 AAAA A ( LRECL 444 BLKSIZE 444 RECFM VBS )

VERTNEW

&CONTROL OFF

08.14.54

MSG FROM FPKERLY : YOUR JOB HAS FINISHED

← Again, less than 30 seconds was required to run the program due to the fact that only 2 iterations are being used during the debugging.

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

.3

← The output file from the run just completed is to be reviewed

DID YOU RUN VERT ONLINE ?

ENTER YES/NO

.YES

EDIT:

0W A R N I N G NO. 6100 PARAMETER = INTFAIL

EDIT:

.TOP

TOF:

./E R R O R

0 1. E R R O R NO. 4500 PARAMETER = FDESIGN

.T20

0 1. E R R O R NO. 4500 PARAMETER = FDESIGN

0 2. E R R O R NO. 3033 PARAMETER = FDESIGNF

0 3. E R R O R NO. 4500 PARAMETER = FDESIGNF

0 4. E R R O R NO. 4500 PARAMETER = HACSUB

0 5. E R R O R NO. 4500 PARAMETER = TISUB

0 6. E R R O R NO. 4500 PARAMETER = HACIDES

0 7. E R R O R NO. 3033 PARAMETER = HACFAIL

0 8. E R R O R NO. 4500 PARAMETER = HACFAIL

0 9. E R R O R NO. 4500 PARAMETER = TIDES

0 10. E R R O R NO. 3033 PARAMETER = TIFAIL

0 11. E R R O R NO. 4500 PARAMETER = TIFAIL

0 12. E R R O R NO. 4500 PARAMETER = DOCUMNT

0 13. E R R O R NO. 3033 PARAMETER = DOCFAIL

0 14. E R R O R NO. 4500 PARAMETER = DOCFAIL

0 15. E R R O R NO. 4500 PARAMETER = FAB

0 16. E R R O R NO. 3033 PARAMETER = FABFAIL

0 17. E R R O R NO. 4500 PARAMETER = FABFAIL

0 18. E R R O R NO. 4500 PARAMETER = BTEST

0 19. E R R O R NO. 3855 PARAMETER = BTEST

0 20. E R R O R NO. 4500 PARAMETER = REDSGN

.DO

0 21. E R R O R NO. 4500 PARAMETER = OTEST

All 4500 Errors were caused by failing to enter "M" as "M**bbbb**" during file creation. Consequently, these arc entries were shifted out of the proper columnar order by the free form program.

All 3033 Errors were caused by failure to enter the node "FAIL" during file creation.

This error was caused by getting the value "4" (Most Likely Time) and "10" (Maximum Time) in reverse order on the Satellite arc for arc "BTEST".

EDIT,

.T\*

EOF,

|    |             |           |      |                      |                      |
|----|-------------|-----------|------|----------------------|----------------------|
| 0  | 21.         | E R R O R | NO.  | 4500                 | PARAMETER = QTEST    |
| 0  | 22.         | E R R O R | NO.  | 3033                 | PARAMETER = OTFAIL   |
| 0  | 23.         | E R R O R | NO.  | 4500                 | PARAMETER = OTFAIL   |
| 0  | 24.         | E R R O R | NO.  | 4500                 | PARAMETER = DELPROT  |
| 0  | 25.         | E R R O R | NO.  | 3033                 | PARAMETER = SHIPFAIL |
| 0  | 26.         | E R R O R | NO.  | 4500                 | PARAMETER = SHIPFAIL |
| 0  | 27.         | E R R O R | NO.  | 4500                 | PARAMETER = A/CMOD   |
| 0  | 28.         | E R R O R | NO.  | 3033                 | PARAMETER = MODFAIL  |
| 0  | 29.         | E R R O R | NO.  | 4500                 | PARAMETER = MODFAIL  |
| 0  | 30.         | E R R O R | NO.  | 4500                 | PARAMETER = INTGON   |
| 0  | 31.         | E R R O R | NO.  | 3033                 | PARAMETER = INTFAIL  |
| 0  | 32.         | E R R O R | NO.  | 4500                 | PARAMETER = INTFAIL  |
| 0  | 33.         | E R R O R | NO.  | 4500                 | PARAMETER = DT/OT    |
| 0  | 34.         | E R R O R | NO.  | 5788                 | PARAMETER = FDESGN   |
| 0  | 35.         | E R R O R | NO.  | 5788                 | PARAMETER = HACSUB   |
| 0  | 36.         | E R R O R | NO.  | 5788                 | PARAMETER = DOCUMNT  |
| 0  | 37.         | E R R O R | NO.  | 5788                 | PARAMETER = HACIDES  |
| 0  | 38.         | E R R O R | NO.  | 5788                 | PARAMETER = TIDES    |
| 0  | 39.         | E R R O R | NO.  | 5788                 | PARAMETER = A/CMOD   |
| 0  | 40.         | E R R O R | NO.  | 5788                 | PARAMETER = FAB      |
| 0  | 41.         | E R R O R | NO.  | 5788                 | PARAMETER = BTEST    |
| 0  | 42.         | E R R O R | NO.  | 5788                 | PARAMETER = QTEST    |
| 0  | 43.         | E R R O R | NO.  | 5788                 | PARAMETER = DELPROT  |
| 0  | 44.         | E R R O R | NO.  | 5788                 | PARAMETER = INTGON   |
| 0  | 45.         | E R R O R | NO.  | 5388                 | PARAMETER = ICOMP    |
| 0  | 46.         | E R R O R | NO.  | 5788                 | PARAMETER = DT/OT    |
| 0W | A R N I N G | NO.       | 6100 | PARAMETER = FDESGNF  |                      |
| 0W | A R N I N G | NO.       | 6100 | PARAMETER = HACFAIL  |                      |
| 0W | A R N I N G | NO.       | 6100 | PARAMETER = TIFAIL   |                      |
| 0W | A R N I N G | NO.       | 6100 | PARAMETER = DOCFAIL  |                      |
| 0W | A R N I N G | NO.       | 6100 | PARAMETER = FABFAIL  |                      |
| 0W | A R N I N G | NO.       | 6100 | PARAMETER = OTFAIL   |                      |
| 0W | A R N I N G | NO.       | 6100 | PARAMETER = SHIPFAIL |                      |
| 0W | A R N I N G | NO.       | 6100 | PARAMETER = MODFAIL  |                      |
| 0W | A R N I N G | NO.       | 6100 | PARAMETER = INTFAIL  |                      |

All 5788 Errors were also caused by failing to enter "M" as "M b b b b" during file creation.

This error was caused by failing to enter the master and satellite arc cards for "DTFAIL" during file creation.

Warnings can be ignored.

EDIT,  
.QUIT  
ENTER YES/NO FOR ROUTING  
.NO  
E (194) R/O

MAIN MENU LEVEL: ENTER THE OPTION DESIRED : ←

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

If so desired, depressing the "PAGE" button before completing the entry "NO" above will place this menu on a separate page.

.5

← Item 5 is selected to correct the errors just found in "VIFACTS".

ENTER FILENAME OF VERT INPUT FILE TO BE EDITED

.VIFACTS

EDIT:

TOF:

./FDESIGN

Find the first 4500 Error

FDESIGN FACEPTEDFIJOINED 1.0 DEVELOP AND DESIGN FACTS

.T3

FDESIGN FACEPTEDFIJOINED 1.0 DEVELOP AND DESIGN FACTS

FDESIGN DTIME 1 3.0 9.0 18.0 12.0

FDESIGN M 1 .99

.ZONE 9 28

.C/M /M/\*

Use the CMS Zone and Change commands to line up the columns which were out of order. 2 passes are required.

FDESIGN M 1 .99

FDESIGNF M 1 .01

HACSUB M 1 .75

TISUB M 1 .25

HACIDES M 1 .9

HACFAIL M 1 .1

TIDES M 1 .95

TIFAIL M 1 .07

DOCUMNT M 1 .99

DOCFAIL M 1 .01

FAB M 1 .9

FABFAIL M 1 .1

BTEST M 1 .9

REDSGN M 1 .1

OTEST M 1 .9

OTFAIL M 1 .1

DELPROT M 1 .9

SHIPFAIL M 1 .1

A/CMOD M 1 .9

MODFAIL M 1 .1

INTGON M 1 .9

INTFAIL M 1 .1

DT/OT M 1 .1

EOF:

The "\*" indicates that every occurrence within the data file will be so changed.

```

EDIT,
.TOP
TOF,
.ZONE 1 80
./FDESGN
FDESGN FACEPTEDFIJOINED 1.0 DEVELOP AND DESIGN FACTS
.DO2
FDESGN M 1 .99
.ZONE 9 15
.C/M 1 /M 1/*
FDESGN M 1 .99
FDESGNF M 1 .01
HACSUB M 1 .75
TISUB M 1 .25
HACIDES M 1 .9
HACFAIL M 1 .1
TIDES M 1 .95
TIFAIL M 1 .07
DOCUMNT M 1 .99
DOCFAIL M 1 .01
FAB M 1 .9
FABFAIL M 1 .1
BTEST M 1 .9
REDSGN M 1 .1
QTEST M 1 .9
OTFAIL M 1 .1
DELPROT M 1 .9
SHIPFAIL M 1 .1
A/CMOD M 1 .9
MODFAIL M 1 .1
INTGON M 1 .9
INTFAIL M 1 .1
DT/OT M 1 .1
EOF,

```

2nd Pass.

At this point all 4500 and 5788 Errors have been corrected



```

EDIT:
.TOP
TOF:
.ZONE 1 80
./BTEST
BTEST FABCOMP BTCOMP 1.0 BENCH TESTING
.DOWN
BTEST DTIME 1 3.0 3.0 4.0 10.0
.C/10.0/ 4.0/
BTEST DTIME 1 3.0 3.0 4.0 4.0 } Error Number 3855
.C/ 4.0/10.0/ is corrected
BTEST DTIME 1 3.0 3.0 10.0 4.0
./OT M
DT/OT M 1 .1
.I
INPUT:
.DTFAIL ICOMP FAIL 1.0 FAIL DT/OT TESTING } Error Number 5388 is Corrected
.DTFAIL DTIME 1 .1

```

DT/OT TESTING COMPLETED

```

EDIT:
./DTCOMP
DTCOMP 2 1
.I
INPUT:
.FAIL 4 11
SINK FOR FAILED ACTIVITIES ← Error Numbers 3033
are corrected

```

EDIT:  
 .FILE ← The changes are made permanent

MAIN MENU LEVEL, ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

H-30

.1 ← VIFACTS is again to be run to  
continue the debugging

DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ? ENTER YES/NO

.NO

ENTER VERT INPUT FILE NAME

.VIFACTS

FI 05 DISK VIFACTS DATA A1

FI 06 DISK VOUTPUT AAAA A

FI 07 DISK VERTPUN AAAA A

FI 08 DISK VERT1 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )

FI 09 DISK VERT2 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )

FI 10 DISK VERT3 AAAA A ( LRECL 96 BLKSIZE 964 RECFM VBS )

FI 11 DISK VERT4 AAAA A ( LRECL 444 BLKSIZE 444 RECFM VBS )

VERTNEW

&CONTROL OFF

09:31:06

MSG FROM FPKERLY : YOUR JOB HAS FINISHED ← Again, less than 30 seconds  
was required

MAIN MENU LEVEL, ENTER THE OPTION DESIRED ,

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

.3 ← The output from the last  
VIFACTS run is reviewed for errors

DID YOU RUN VERT ONLINE ?

ENTER YES/NO

.YES

EDIT,

0 2. E R R O R NO. 5922 PARAMETER = ICOMP

EDIT,

.UP

0 1. E R R O R NO. 5922 PARAMETER = TIWINS

.QUIT

ENTER YES/NO FOR ROUTING

.NO

} Error 5922 indicates the nodes "ICOMP" and "TIWINS" have respectively, 2 or more arcs proceeding from these nodes whose probabilities of occurrence do not sum to 1.0.

E (194) R/O

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

.5 ← Edit VIFACTS to correct 5922 Errors

ENTER FILENAME OF VERT INPUT FILE TO BE EDITED

.VIFACTS

EDIT:

TOF:

./TIWINS

TISUB IACCEPTDTIWINS 1.0 CONTRACTOR 2 SUBMITS ITMS DESIGN PROPOSAL

.=

TIDES TIWINS DESCOMP 1.0 CONTRACTOR 2 DESIGNS ITMS

.T5

TIDES TIWINS DESCOMP 1.0 CONTRACTOR 2 DESIGNS ITMS

TIDES DTIME 1 3.0 8.0 16.0 10.0

TIDES M 1 .95

TIFAIL TIWINS FAIL 1.0 CONTRACTOR 2 ITMS DESIGN FAILS

TIFAIL M 1 .07

.C/7/5/

TIFAIL M 1 .05

./ICOMP

INTGON ISTART ICOMP 1.0 INTEGRATE FACTS/ITMS INTO AIRCRAFT

.=

DT/OT ICOMP DTCOMP 1.0 DEVELOPMENT/OPERATIONAL TESTING

.T5

DT/OT ICOMP DTCOMP 1.0 DEVELOPMENT/OPERATIONAL TESTING

DT/OT DTIME 1 3.0 3.0 8.0 4.5

DT/OT M 1 .1

DTFAIL ICOMP FAIL 1.0 FAIL DT/OT TESTING

DTFAIL M 1 .1

.UP2

DT/OT M 1 .1

.C/.1/.9/

DT/OT M 1 .9

.FILE

This change corrects the second 5922 Error

This change corrects the first 5922 Error

The changes are made permanent

MAIN MENU LEVEL: ENTER THE OPTION DESIRED ,

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

.1 ← VIFACTS is again to be run  
to continue the debugging



DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ? ENTER YES/NO

.NO

ENTER VERT INPUT FILE NAME

.VIFACTS

FI 05 DISK VIFACTS DATA A1

FI 06 DISK VOUTPUT AAAA A

FI 07 DISK VERTPUN AAAA A

FI 08 DISK VERT1 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )

FI 09 DISK VERT2 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )

FI 10 DISK VERT3 AAAA A ( LRECL 96 BLKSIZE 964 RECFM VBS )

FI 11 DISK VERT4 AAAA A ( LRECL 444 BLKSIZE 444 RECFM VBS )

VERTNEW

&CONTROL OFF

09:41:33

MSG FROM FPKERLY : YOUR JOB HAS FINISHED

MAIN MENU LEVEL, ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

.3 ← The output from the last VIFACTS  
run is to be reviewed

DID YOU RUN VERT ONLINE ?

ENTER YES/NO

.YES

EDIT,

0 LAST RANDOM NUMBER SEED = 2113587123 ← This line indicates that VIFACTS

EDIT,

.FILE

ENTER YES/NO FOR ROUTING

.NO

has been successfully debugged

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

5 ← Since the last run was successful, I  
am now ready to change VIFACTS  
to begin analysis runs

ENTER FILENAME OF VERT INPUT FILE TO BE EDITED

.VIFACTS

EDIT:

TOF:

.T2

TOF:

1 4

This CMS Command allows me to concern myself with only the 9th column of every record in the data file

435459 2 1.0 1.0

.ZONE 9 9

.C/ /1/

1 4

435459 2 1.0 1.0

.ZONE 1 80

.C/ 2/1000/

1 4

435459 1000 1.0 1.0

./ENDARC

ENDARC

./ICOMP

ICOMP 2 3

INTEGRATION COMPLETED

.ZONE 13 16

.C/ /16 1/

ICOMP 2

316 1

INTEGRATION COMPLETED

.DO

DTCOMP 2 1

DT/OT TESTING COMPLETED

.C/ /16 /

DTCOMP 2

116

DT/OT TESTING COMPLETED

.FOLE

I changed the VIFACTS data file to 1000 iterations for subsequent analysis runs


This change enables me to get a "camera-ready" graph of the output from this node (ICOMP).

Reset the Zone to its normal setting

Since "DTCOMP" is a terminal node (column 12 of this record has the value "1"), columns 15 and 16 of this record should be left blank.

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

.2  I am now ready to do analysis runs

BATCH1 NOT LOGGED ON

IS BATCH1 "DSC" ? ENTER YES/NO

.NO

YOU CAN'T RUN VERT OFFLINE AT THIS TIME BECAUSE BATCH1 IS NOT LOGGED ON

I HAVE SENT A MESSAGE TO THE OPERATOR TO LOG BATCH1 ON

WAIT UNTIL THE OPERATOR TELLS YOU THAT BATCH1 IS LOGGED ON  
BEFORE YOU USE MENU ITEM NO.2 AGAIN

← Depress the "RETURN" button to continue

The CMS Batch Facility was not logged on. The executive file will not let me run VERT offline since the Batch facility is not available.

NOTE: The new Batch System is called "BATCHDV" instead of Batch1. This sample session was completed before the new Batch system became operational.

MAIN MENU LEVEL, ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

.5 ← Since I can't run VERT offline, I decided to run the VIFACTS data file online, but first, I need to lower the number of monte carlo iterations so that I won't tie up the terminal as long.



ENTER FILENAME OF VERT INPUT FILE TO BE EDITED

.VIFACTS

EDIT,

TOF,

.T2

TOF,

1 4 1 435459 1000 1.0 1.0

.C/1000/ 250/ 1.0 1.0


1 4 1 435459 250 1.0 1.0

.FILE

I changed the number of iterations to 250. The output graphs will not have as smooth as a curve as it would have had with 1000 iterations, but I will still be able to see the overall trend of the curve.

MAIN MENU LEVEL: ENTER THE OPTION DESIRED ,

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

.1  I am now ready to run VIFACTS online

DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ? ENTER YES/NO

.YES

ENTER VERT INPUT FILE NAME

.VIFACTS

GLOBAL TXTLIB FORTMOD2 MOD2EEH TTXTC S TTXAGII SANDESUB TELELIB CMSLIB

FI 01 DISK VBANKNAM DATA A1 ( RECFM FB LRECL 80

VBANKNAM

ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN

< NO SPACES, 10 CHARCTERS MAX>

.ICOMP\$ ←

DO YOU WANT TO ENTER ANOTHER FILENAME

ENTER Y FOR YES OR N FOR NO

.Y

ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN

< NO SPACES, 10 CHARCTERS MAX>

.DTCOMP\$ ←

DO YOU WANT TO ENTER ANOTHER FILENAME

ENTER Y FOR YES OR N FOR NO

.N

"ICOMP" and "DTCOMP" are the names I chose to give to the filenames of the graph data files for the two nodes that I selected to get graph output on. "ICOMP" and "DTCOMP" also happen to be the names given to the two nodes. It is not required that they be the same.

FI 01 DISK VBANKNAM DATA A1 ( RECFM FB LRECL 80  
FI 05 DISK VIFACTS DATA A1  
FI 06 DISK VOUTPUT AAAA A1  
FI 07 DISK VERTPUN AAAA A1  
FI 08 DISK VERT1 AAAA A1 ( LRECL 88 BLKSIZE 884 RECFM VBS )  
FI 09 DISK VERT2 AAAA A1 ( LRECL 88 BLKSIZE 884 RECFM VBS )  
FI 10 DISK VERT3 AAAA A1 ( LRECL 96 BLKSIZE 964 RECFM VBS )  
FI 11 DISK VERT4 AAAA A1 ( LRECL 444 BLKSIZE 444 RECFM VBS )

VERTNEW1 ←

CP MSG \* YOUR JOB HAS FINISHED  
10:05:21

Notice the different name used here.  
This module has the interface with  
TELLAGRAF; the other (VERTNEW) does  
not.

MSG FROM FPKERLY : YOUR JOB HAS FINISHED

&READ ARGS

← Depress the "RETURN" button to continue

MAIN MENU LEVEL: ENTER THE OPTION DESIRED ,

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

H-49

.7

↖ I am now ready to look at the graphs

SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = DISPLAY VERT GRAPHICS DATA FILES USING TELEGRAF BANKDATA FILES
- 2 = CREATE A VERT GRAPHICS DATA FILE
- 3 = EDIT AN EXISTING VERT GRAPHICS DATA FILE
- 4 = DISPLAY A VERT GRAPHICS DATA FILE WHICH WAS CREATED MANUALLY
- 5 = SAMPLE VERT GRAPHS (SCHEDULE, COST, AND PERFORMANCE CHARTS  
FOR THE COBRA FACTS DRA)
- R = RETURN TO THE MAIN MENU LEVEL
- END = END THE SESSION

.1  
↑  
Item 1 is selected

ARE YOU USING A 4027 COLOR GRAPHICS TERMINAL ? ENTER YES/NO  
.NO

DID YOU RUN VERT ONLINE ? ENTER YES/NO

.YES

EDIT:

TOF:

BANKDATA.

ICOMP\* ← The name of the first graph data file to be  
displayed is shown

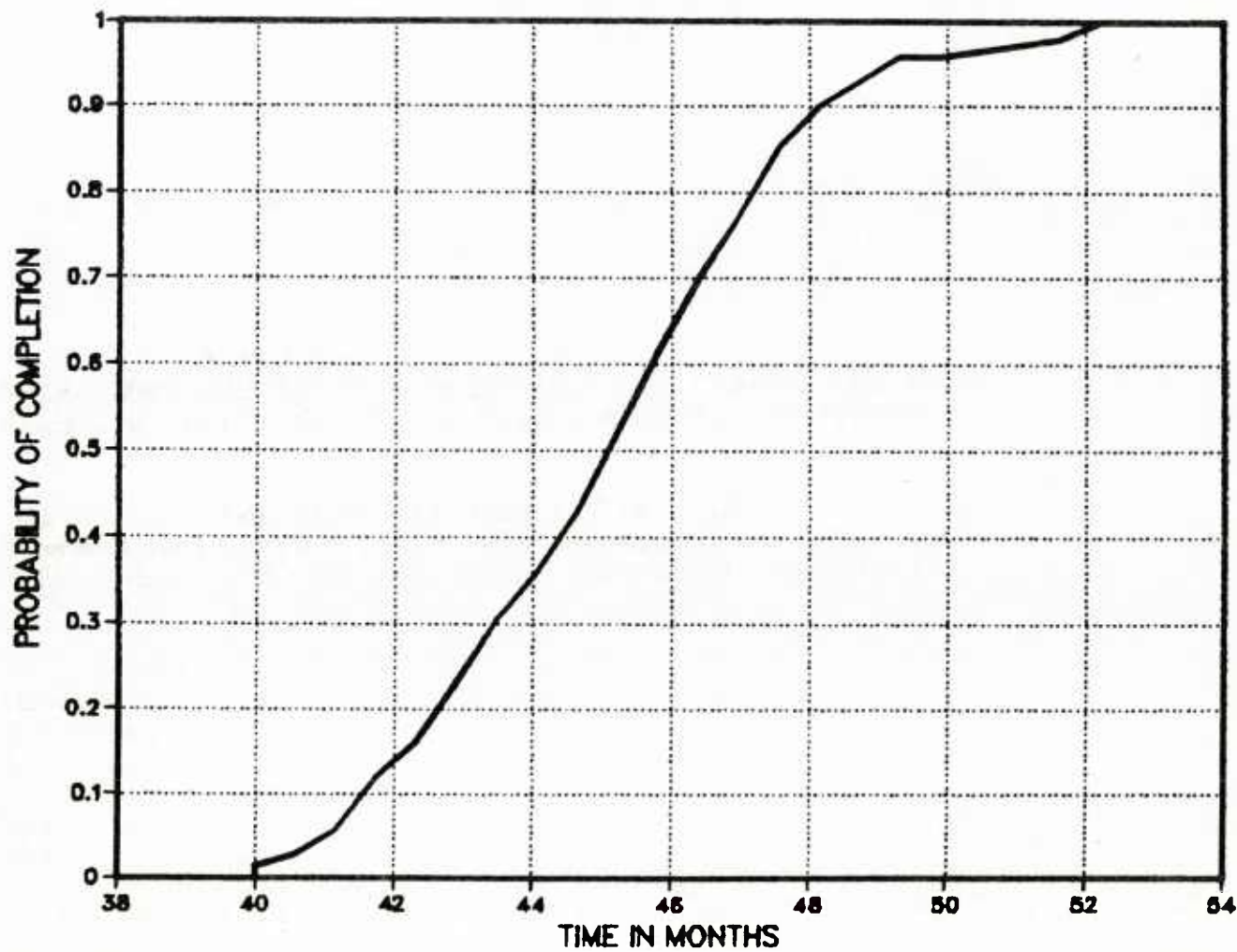
ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>  
.'FACTS/ITMS SYSTEM INTEGRATION SCHEDULE'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>  
.'TIME IN MONTHS'.

After depressing the "RETURN" button to  
complete this entry, the screen will  
automatically clear and the graph will  
be displayed.

← Depress the "RETURN" button to continue

## FACTS/ITMS SYSTEM INTEGRATION SCHEDULE





END OF TELL-A-GRAF 4.0 -- 7450 VECTORS GENERATED IN 1 PLOT FRAMES.  
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.

EDIT;

EDIT;

EDIT;

TOF;

BANKDATA.

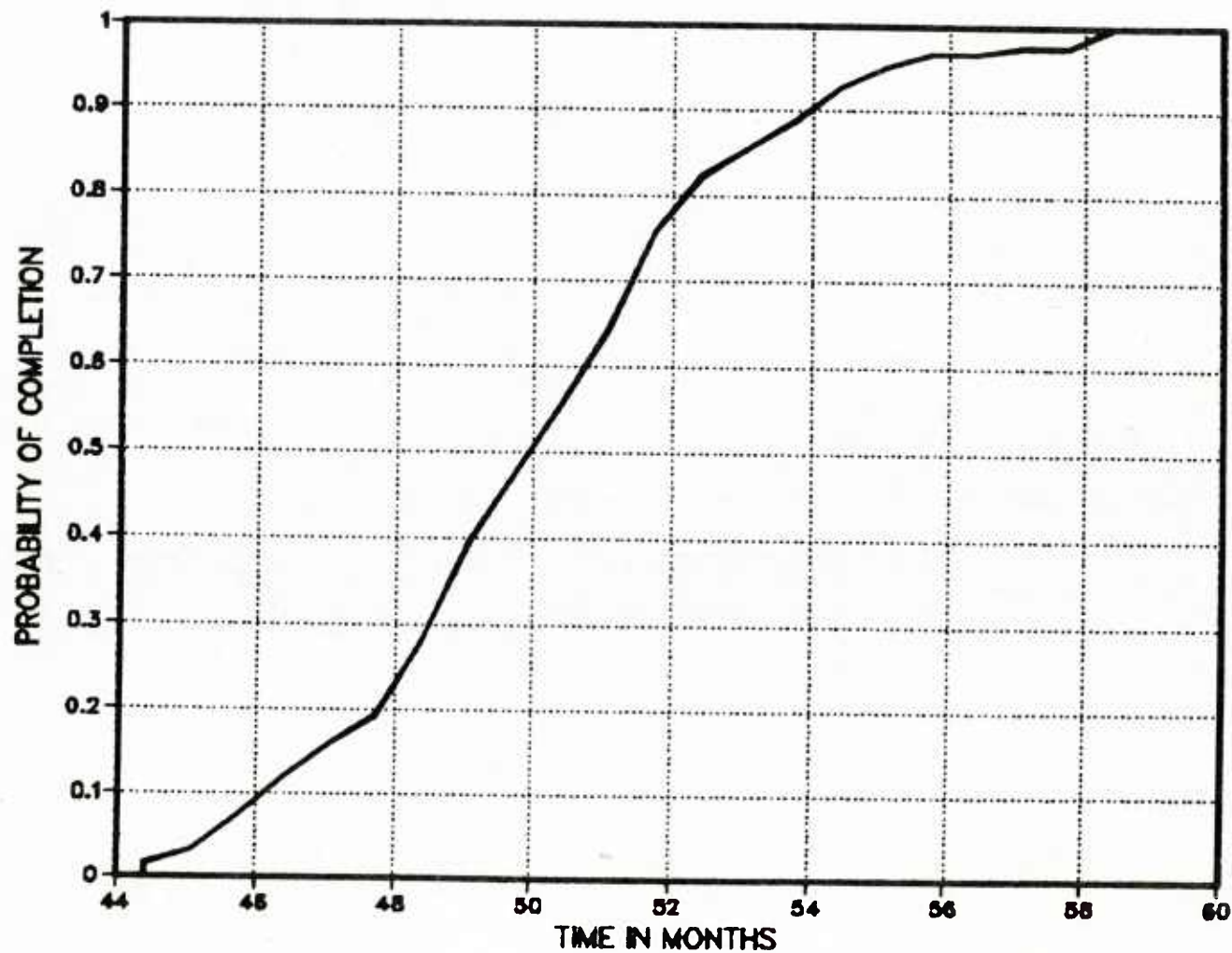
DTCOMP\* ← The name of the second graph data file  
to be displayed is shown

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>  
'DT/OT TESTING SCHEDULE FOR FACTS/ITMS'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE  
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>  
'TIME IN MONTHS'.

← Depress the "RETURN" button to continue

## DT/OT TESTING SCHEDULE FOR FACTS/ITMS



END OF TELL-A-GRAF 4.0 -- 7544 VECTORS GENERATED IN 1 PLOT FRAMES.  
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.

EDIT;

EDIT;

INPUT FILE 'VBANKNAM DATA A1' NOT FOUND. ← Since only 2 nodes were requested  
SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED : and since Network Time is the  
only parameter used in VIFACTS, only 2 graphs  
are displayed.

- 1 = DISPLAY VERT GRAPHICS DATA FILES USING TELEGRAF BANKDATA FILES
- 2 = CREATE A VERT GRAPHICS DATA FILE
- 3 = EDIT AN EXISTING VERT GRAPHICS DATA FILE
- 4 = DISPLAY A VERT GRAPHICS DATA FILE WHICH WAS CREATED MANUALLY
- 5 = SAMPLE VERT GRAPHS (SCHEDULE, COST, AND PERFORMANCE CHARTS  
FOR THE COBRA FACTS DRA)
- R = RETURN TO THE MAIN MENU LEVEL
- END = END THE SESSION

.END

R: ← I am now out of "VERTEX" and back  
in CMS "READY" mode

APPENDIX I

SAMPLE SESSION NUMBER 4:

PLOT USING AN EXISTING VERT

PLOT DATA FILE

(Tektronix 4054 Graphics Terminal) <sup>1</sup>

<sup>1</sup>

The Tektronix 4054 Graphics Terminal emulates a Tektronix 4014 Graphics Terminal.

CALL "RATE", 9600, 0, 2 ← Set baud rate  
CALL "TERMIN"

enter class 116622  
USACC DATA NUMBERS ARE: AV693-3582 OR 314-263-3582  
class 162 start  
CMS6  
READY-TO-IBM

S+E VM/SP ONLINE  
! ← Depress "RETURN" button

.LOG FPKERLY

restart

.LOG FPKERLY

ENTER PASSWORD:

.00000000

} Enter userid and password

DASD 190 LINKED R/O; R/W BY MAINT; R/O BY 018 USERS

DASD 19E LINKED R/O; R/W BY MAINT; R/O BY 017 USERS

DASD 196 LINKED R/W; R/O BY FTBACKUP

FILES: 002 RDR, NO PRT, NO PUN

LOGON AT 06:18:54 CDT MONDAY 08/02/82

MIDWEST S+E COMPUTER CENTER

. ← Depress "RETURN" button

Y (19E) R/O

CMSZER SYSTEM NAME 'CMSZER' NOT AVAILABLE.

CMSSEG SYSTEM NAME 'CMSSEG' NOT AVAILABLE.

DASD 291 DEFINED

'19E' REPLACES 'Y (19E) '

Y (19E) R/O

E (194) R/O

R; ← CMS "READY" mode

THIS PAGE DEPICTS  
LOGGING ON THE COMPUTER  
TERMINAL (TEKTRONIX 4054  
COMPUTER GRAPHICS TERMINAL)  
AND GETTING INTO CMS  
READY MODE.

UNLESS OTHERWISE STATED  
ALL PAGES IN THIS SESSION  
WERE CREATED BY MANUALLY  
DEPRESSING THE "PAGE"  
BUTTON ON THE COMPUTER  
TERMINAL. EACH PAGE IS  
AN ACTUAL PICTURE OF  
THE COMPUTER GRAPHICS  
TERMINAL CRT SCREEN.

CMS

.VERTEX  
E (194) R/O

Enter the name of the executive file which  
runs the menu technique.

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = RUN VERT ONLINE
- 2 = RUN VERT OFFLINE (CMS BATCH)
- 3 = VIEW VERT OUTPUT
- 4 = CREATE A VERT INPUT FILE
- 5 = EDIT AN EXISTING VERT INPUT FILE
- 6 = GET VERT NETWORK PLOT MENU
- 7 = GET VERT GRAPH MENU
- LIST = GET VERT DATASETS DISPLAY LISTING MENU
- END = END THE SESSION

.6 ← Item 6 is selected

SECONDARY MENU LEVEL, ENTER THE OPTION DESIRED :

- 1 = CREATE A VERT PLOT DATA FILE
- 2 = EDIT AN EXISTING VERT PLOT DATA FILE
- 3 = DISPLAY A VERT PLOT
- 4 = SAMPLE VERT PLOT (TROOP SUPPORT LEVEL II MANAGED  
ROUTINE ECP PROCESS -PHASE 1)
- R = RETURN TO THE MAIN MENU LEVEL
- END = END THE SESSION

3 ← ENTER FILENAME  
.VPLTUGN1 ← A VERT plot data file already created is being  
selected for display. After entering the name  
of the VERT plot data file, the CRT screen  
will automatically be cleared.

START OF TAPE  
OPTIONS?

E=ERASE  
H=HARDCOPY  
W=SET SCREEN SIZE  
S=SKIP FRAMES  
R=RESET OFFSET  
C=CONTINUE  
O=STOP PROGRAM  
?=THIS MESSAGE

.W ← "Set Screen Size" is selected

WHERE WOULD YOU LIKE ORIGIN?(X,Y)

.0.

.0.

ENTER SIZE (WIDTH,HEIGHT)

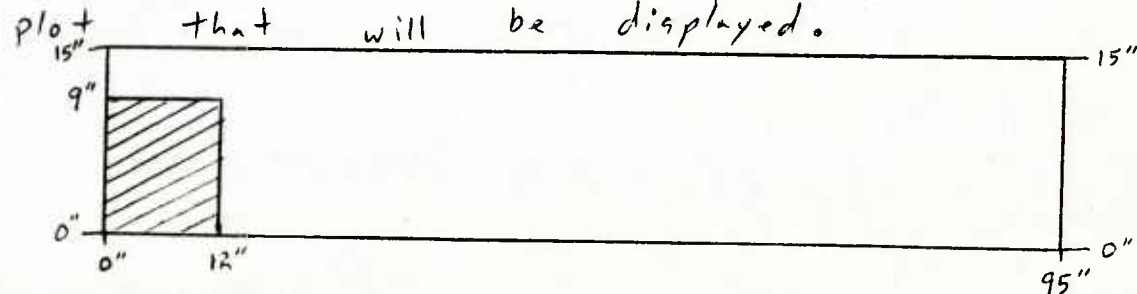
.12.

.9.

.C

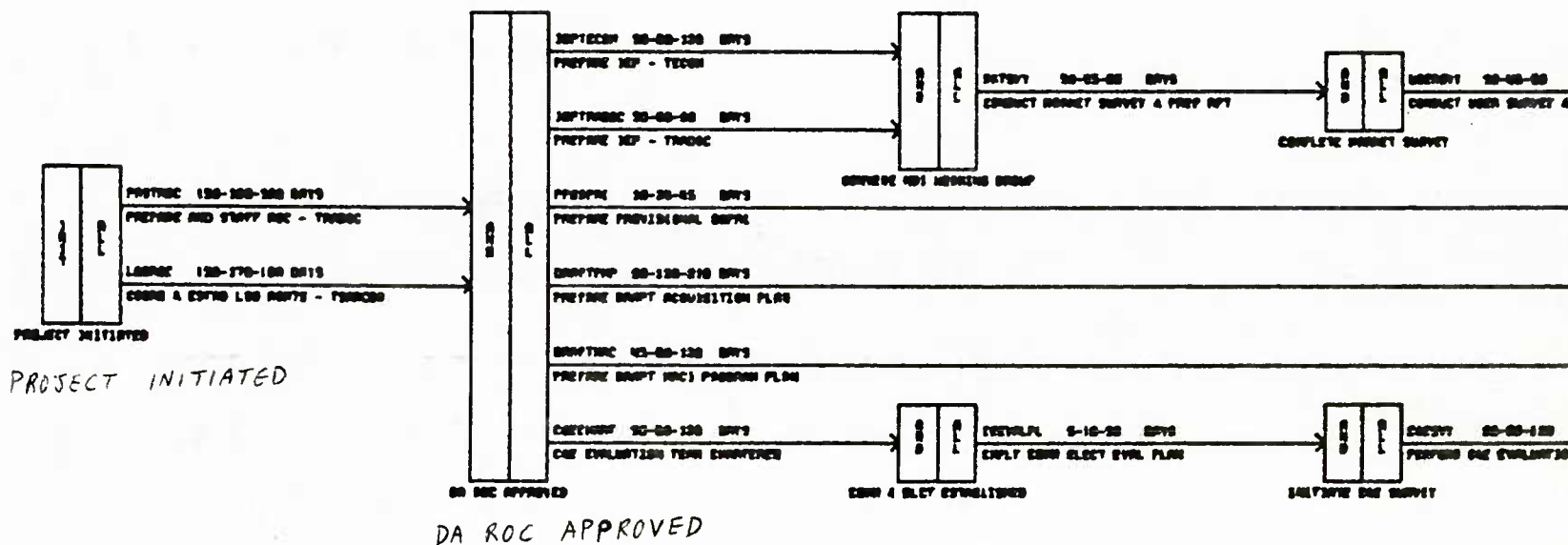
← After entering the "C", the CRT screen will automatically be cleared

NOTE: The "VPLTUGNI" plot is approximately 95 inches wide and 15 inches tall. The schematic below (not to scale) shows that portion of the total plot that will be displayed.





← Depress "RETURN" button to continue.  
 Depress "PAGE" button on terminal  
 before depressing "RETURN" button.



SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = CREATE A VERT PLOT DATA FILE
- 2 = EDIT AN EXISTING VERT PLOT DATA FILE
- 3 = DISPLAY A VERT PLOT
- 4 = SAMPLE VERT PLOT (TROOP SUPPORT LEVEL II MANAGED  
ROUTINE ECP PROCESS -PHASE 1)
- R = RETURN TO THE MAIN MENU LEVEL
- END = END THE SESSION

.3

ENTER FILENAME  
.VPLTUGN1

Another portion of the "VPLTUGN1" plot is to  
be displayed.

ORT screen will automatically clear after completing  
the entry "VPLTUGN1".

START OF TAPE  
OPTIONS?

E=ERASE  
H=HARDCOPY  
W=SET SCREEN SIZE  
S=SKIP FRAMES  
R=RESET OFFSET  
C=CONTINUE  
O=STOP PROGRAM  
?=THIS MESSAGE  
.W

WHERE WOULD YOU LIKE ORIGIN?(X,Y)

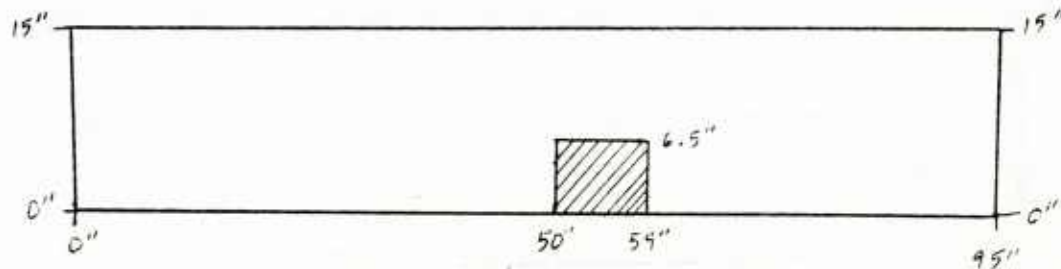
.50.  
.0.

ENTER SIZE (WIDTH,HEIGHT)

.9.  
.6.5  
.C

← CRT screen will automatically clear after entering the "C" and depressing the "RETURN" button to complete the entry.

NOTE: The schematic below shows that portion of the total plot which will be displayed. Since a smaller portion has been chosen than previously, the text on the plot should be more clear.





SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = CREATE A VERT PLOT DATA FILE
- 2 = EDIT AN EXISTING VERT PLOT DATA FILE
- 3 = DISPLAY A VERT PLOT
- 4 = SAMPLE VERT PLOT (TROOP SUPPORT LEVEL II MANAGED  
ROUTINE ECP PROCESS -PHASE 1)
- R = RETURN TO THE MAIN MENU LEVEL
- END = END THE SESSION

.3  
ENTER FILENAME  
.VPLTUGN1

Another portion of the "VPLTUGN1" plot is  
to be displayed.

CRT screen will automatically clear after completing  
the entry "VPLTUGN1".

START OF TAPE  
OPTIONS?

E=ERASE  
H=HARDCOPY  
W=SET SCREEN SIZE  
S=SKIP FRAMES  
R=RESET OFFSET  
C=CONTINUE  
O=STOP PROGRAM  
?=THIS MESSAGE  
.W

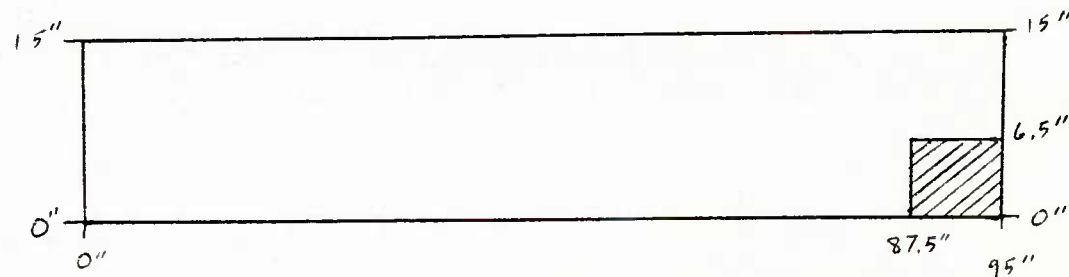
WHERE WOULD YOU LIKE ORIGIN?(X,Y)  
.87.5

.0.  
ENTER SIZE (WIDTH,HEIGHT)

.9.  
.6.5  
.C

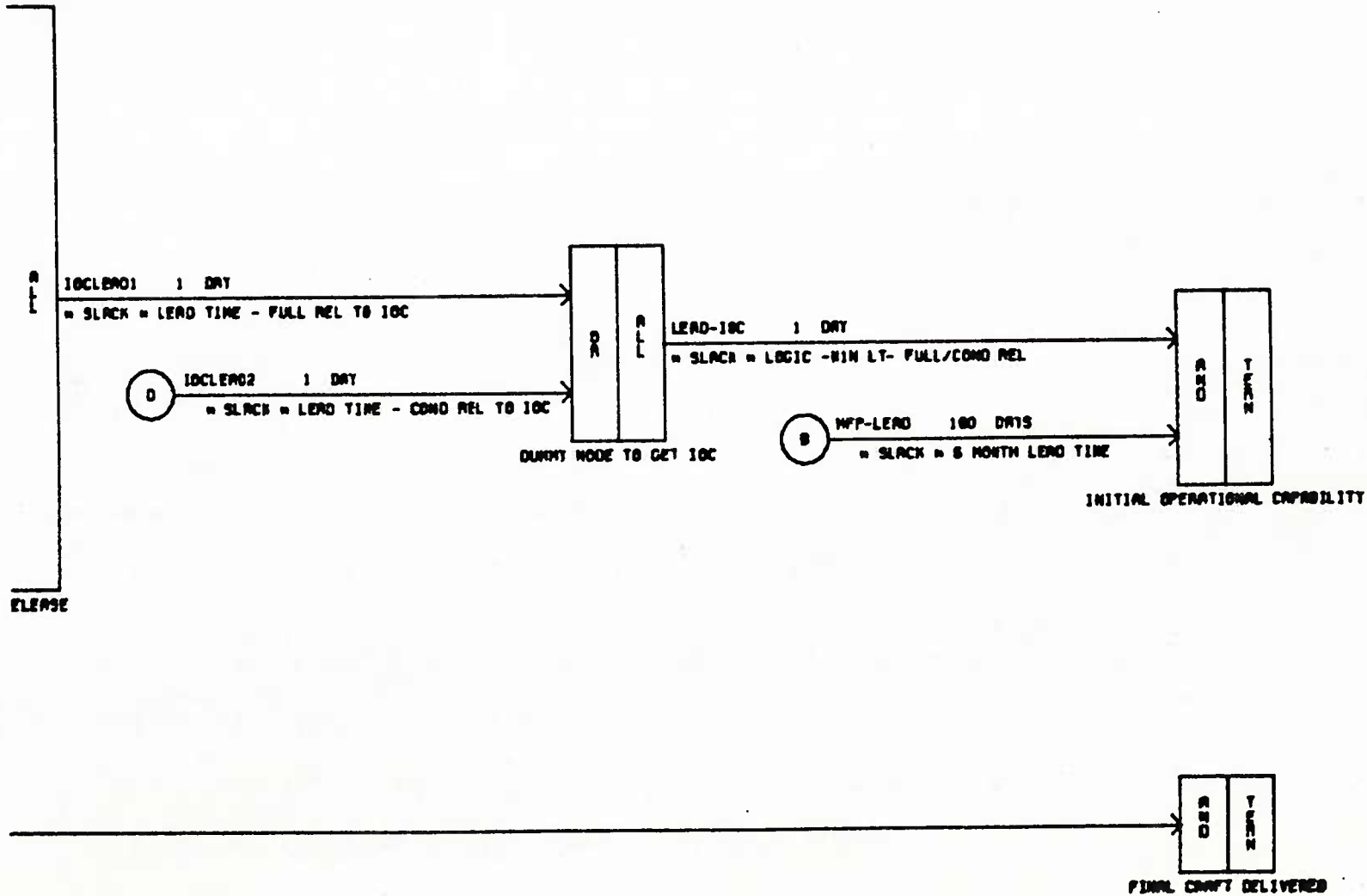
← CRT screen will automatically clear after completing the entry

NOTE: The schematic below shows that portion of the total plot which will be displayed.



← Depress "PAGE" button and then  
"RETURN" button.

I-12



SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

- 1 = CREATE A VERT PLOT DATA FILE
- 2 = EDIT AN EXISTING VERT PLOT DATA FILE
- 3 = DISPLAY A VERT PLOT
- 4 = SAMPLE VERT PLOT (TROOP SUPPORT LEVEL II MANAGED  
ROUTINE ECP PROCESS -PHASE 1)
- R = RETURN TO THE MAIN MENU LEVEL
- END = END THE SESSION

END  
R;

No more plotting and no more activity with  
the menu technique is desired.

In CMS "READY" mode Again